Gallenkamp

18th Edition

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SCIENTIFIC APPARATUS & INSTRUMENTS, LABORATORY FURNITURE & FITTINGS

18th EDITION
GENERAL CATALOGUE

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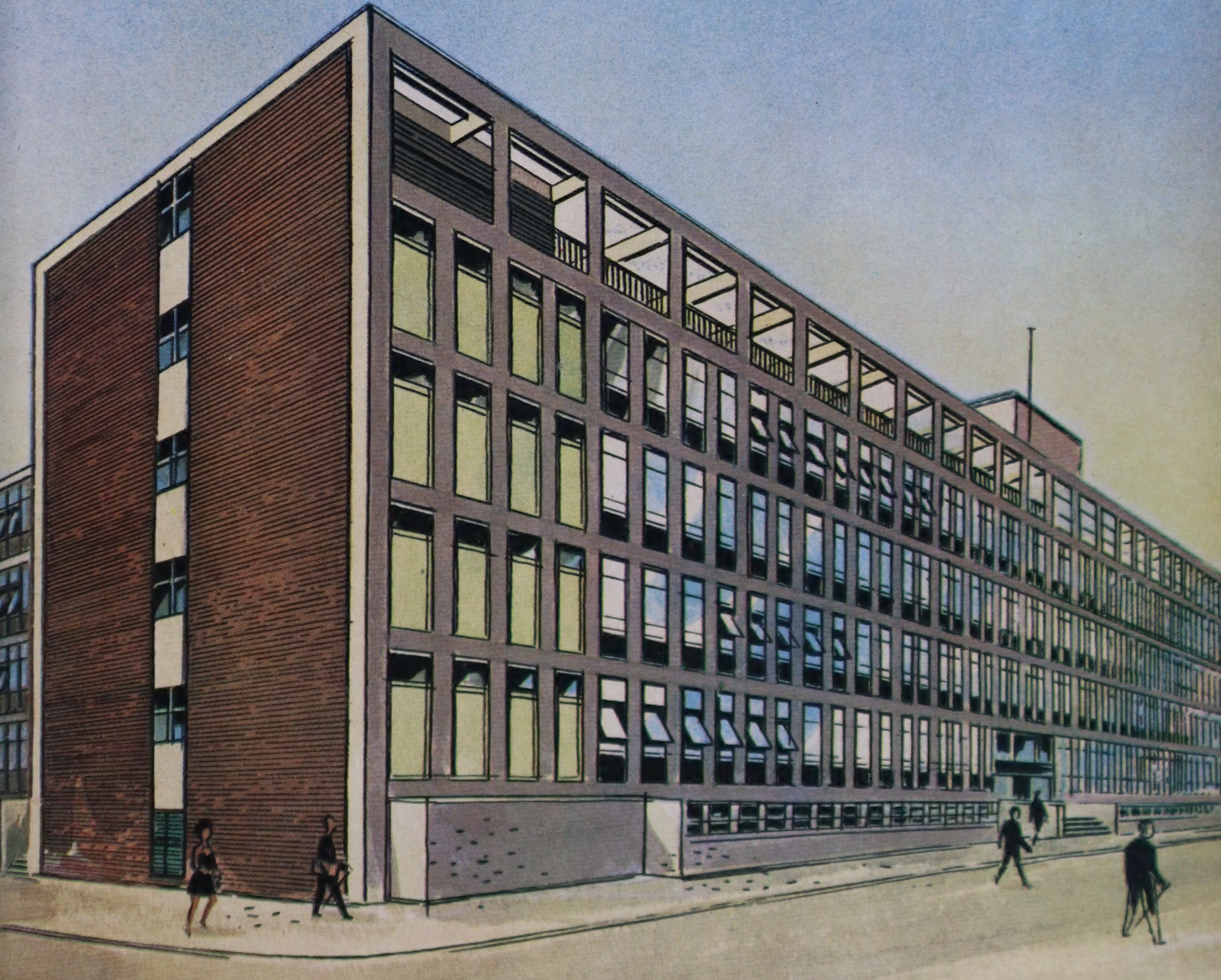

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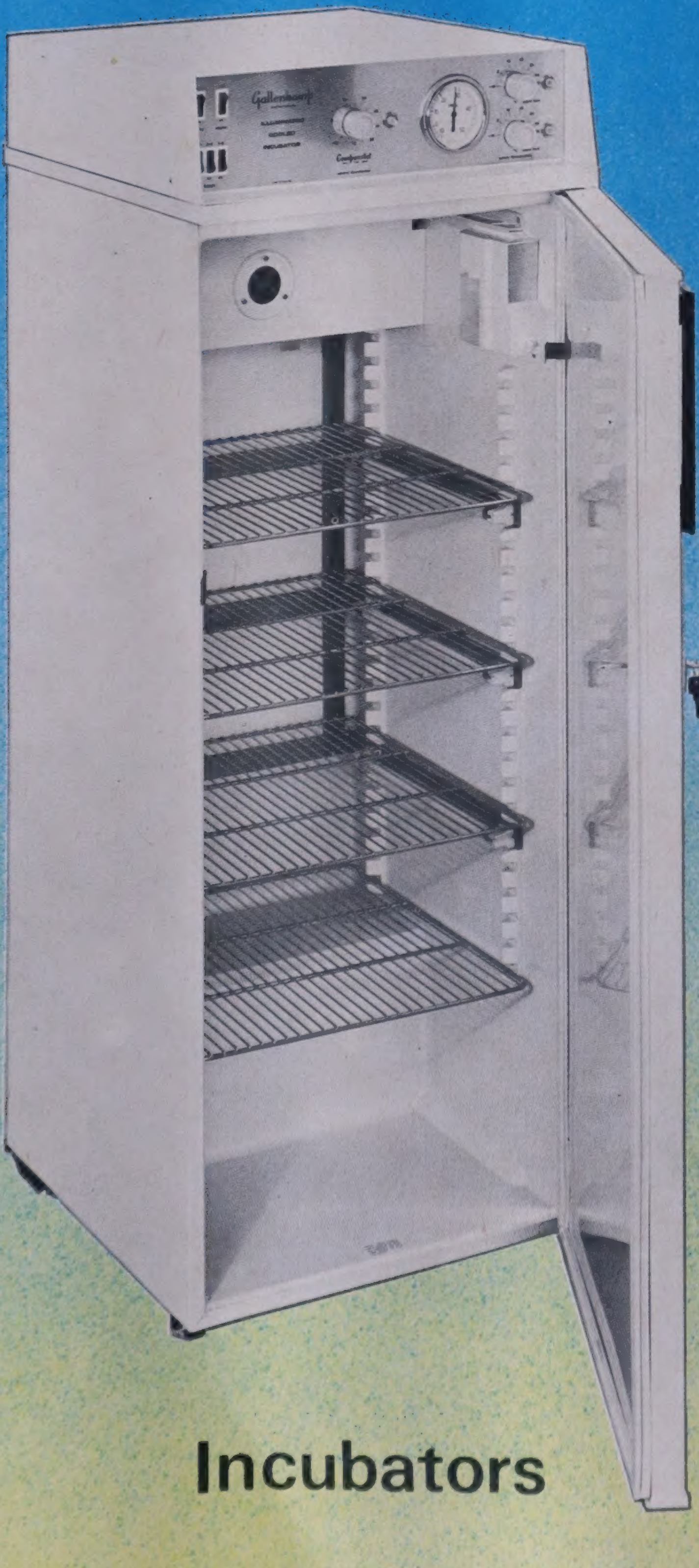
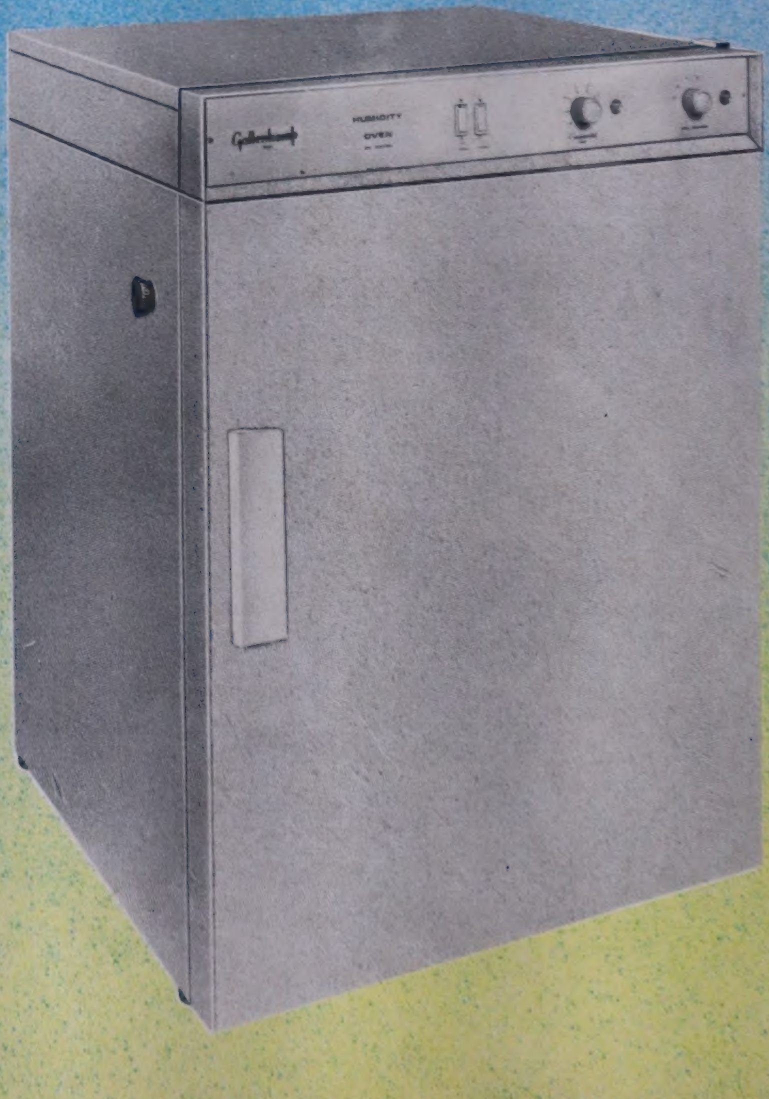
Recent additions to the Gallenkamp range



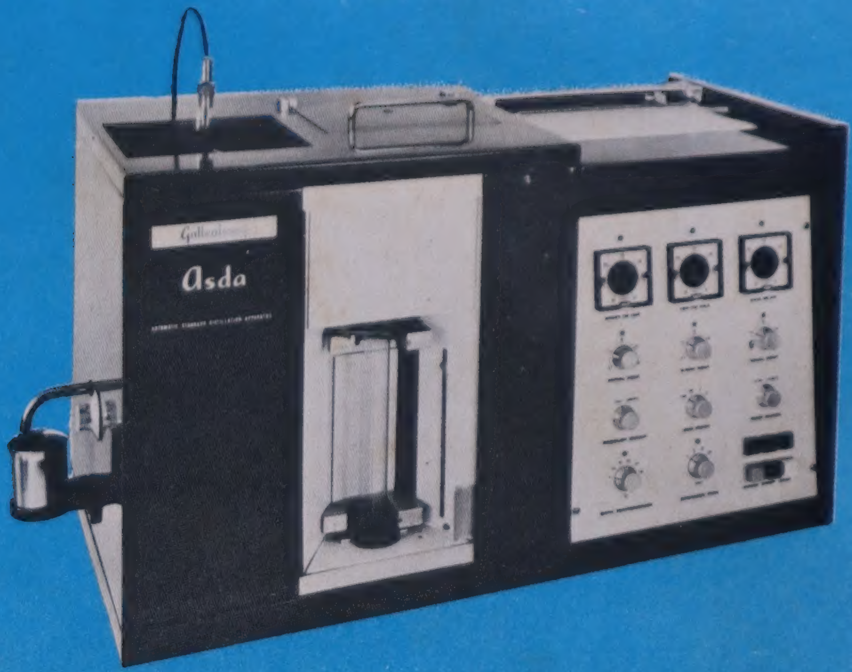
Incubators



Ovens

Gallenkamp
ORBITAL SHAKER

Shakers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Asda

Petroleum Testing Apparatus

Gallenkamp
MAGNETIC STIRRER HOTPLATE
Gallenkamp
MAGNETIC STIRRER

Stirrers and Hotplates

Gallenkamp
LABORATORY CENTRIFUGE

Centrifuges

Gallenkamp

Orbital Incubators

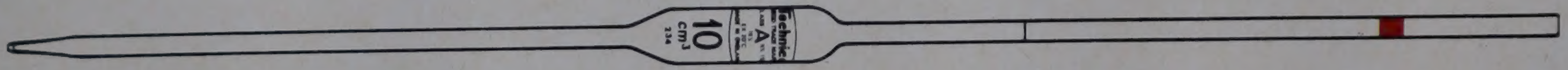
Gallenkamp Glassware
MARKING AND CODING

Technico Volumetric Glassware

Practically all *Technico* volumetric glassware is marked with inscriptions and graduations in **permanent dark amber stain.**

Most *Technico* pipettes are **colour coded to BS 3996** to facilitate the sorting of similar types of pipettes by unskilled personnel.

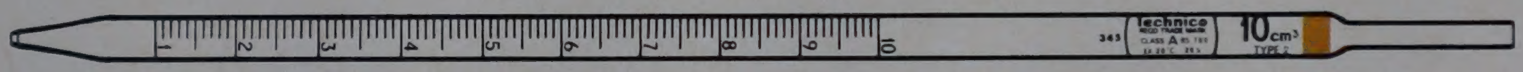
Colour code for One mark and Bulb Pipettes



Colour	White	Orange	Black	Green	Red	2 Black	Blue	Orange	Black	2 Red
Capacity cm³	0·005	0·01	0·02	0·05	0·2	0·5	1	2	3	4

Colour	White	Red	Green	Yellow	Blue	Black	White	Red	Yellow
Capacity cm³	5	10	15	20	25	30	40	50	100

Colour code for Graduated Pipettes



Colour	2 Green	Red	White	2 Orange	2 White	Black	Orange	Green
Capacity cm³	0·1	0·1	0·1	0·1	0·2	0·2	0·2	0·5
Subdivision cm³	0·001	0·005	0·01	0·05	0·002	0·01	0·1	0·005

Colour	2 Red	Yellow	Red	Black	Red	Blue	Orange	Green
Capacity cm³	0·5	1	1	2	5	5	10	25
Subdivision cm³	0·02	0·01	0·1	0·02	0·05	0·1	0·1	0·2

Where two bands of colour are printed on the pipette to denote its capacity, they are printed in equal widths. When a second band of the same colour is much narrower than the first it denotes that the pipette is a graduated pipette to BS 700 type 1.

A plain white band or a sandblast band denotes that the pipette is designed for blow out of the last drop.

SINTAGLASS Sintered Glassware

Most SINTAGLASS sintered glassware is **colour coded for porosity** as shown below.

Colour						
Porosity	0	1	2	3	4	5
Max. Pore Dia.	200–250	100–120	40–50	20–30	5–10	1–1·8 μm
	SINTAGLASS 0	SINTAGLASS 1	SINTAGLASS 2	SINTAGLASS 3	SINTAGLASS 4	SINTAGLASS 5

INTRODUCTION TO THE 18th EDITION OF THE Gallenkamp CATALOGUE

The following explanatory notes are intended to facilitate the use of this 18th edition of our General Catalogue, which supersedes all previous editions.

MAIN AND CROSS REFERENCE ENTRIES

Every article in the catalogue has one main entry, the position of which determines its list number and where the full specification and price will be found. Many articles, for various reasons, require entry in several places. In such instances the subsidiary entries show brief details and the list number so providing a direct reference to the main entry in its alphabetical and numerical sequence.

In addition, we have included a number of cross references to remind users of associated apparatus.

At the back of the catalogue there is a comprehensive index which has been compiled to facilitate the location of obscure items and those having more than one name or description.

PRICES

Previous practice of including prices for each item in the body of the catalogue has been maintained. The quoted prices relate to the supply of goods ex *Gallenkamp* warehouses. They are the prices which we anticipate will be current at the date of issue of this catalogue, but are subject to amendment in accordance with the Conditions of Sale which are printed on pages 12 to 14.

On page 15 of the catalogue there is an explanation of our pricing system which provides, towards the lower end of the price scale, a progressively greater differential in favour of larger quantities.

VALUE ADDED TAX

A system of Value Added Tax (VAT) will be introduced in Great Britain and Northern Ireland with effect from the 1st April 1973.

From that date, invoices for all goods and services supplied by *Gallenkamp* to customers in Great Britain and Northern Ireland will, in addition to the cost of the goods and services, include amounts for VAT at rates and in accordance with the requirements of the VAT regulations.

Goods which are exported by *Gallenkamp* will be 'zero rated' for VAT. This means that no VAT will be chargeable to our overseas customers on such supplies.

AVAILABILITY OF GOODS

The majority of the products included in this catalogue are normally available for immediate supply from stocks held in *Gallenkamp* warehouses.

Goods which are not standard stock are indicated throughout the catalogue by the inclusion of the letter 'N' in the suffix code following the price of the item.

ORDERS AND ENQUIRIES

When ordering or making enquiries please give our catalogue numbers and any other essential data included in the specification, such as size, colour, details of gas or electricity supply, etc.

Catalogue entries clearly indicate available standard voltage ranges of all major electrical instruments and apparatus, and we invite your attention to the note on page 15 of this catalogue concerning electricity supplies.

Orders and enquiries which include such information can be processed with less risk of misinterpretation, and with the minimum of delay.

Gallenkamp

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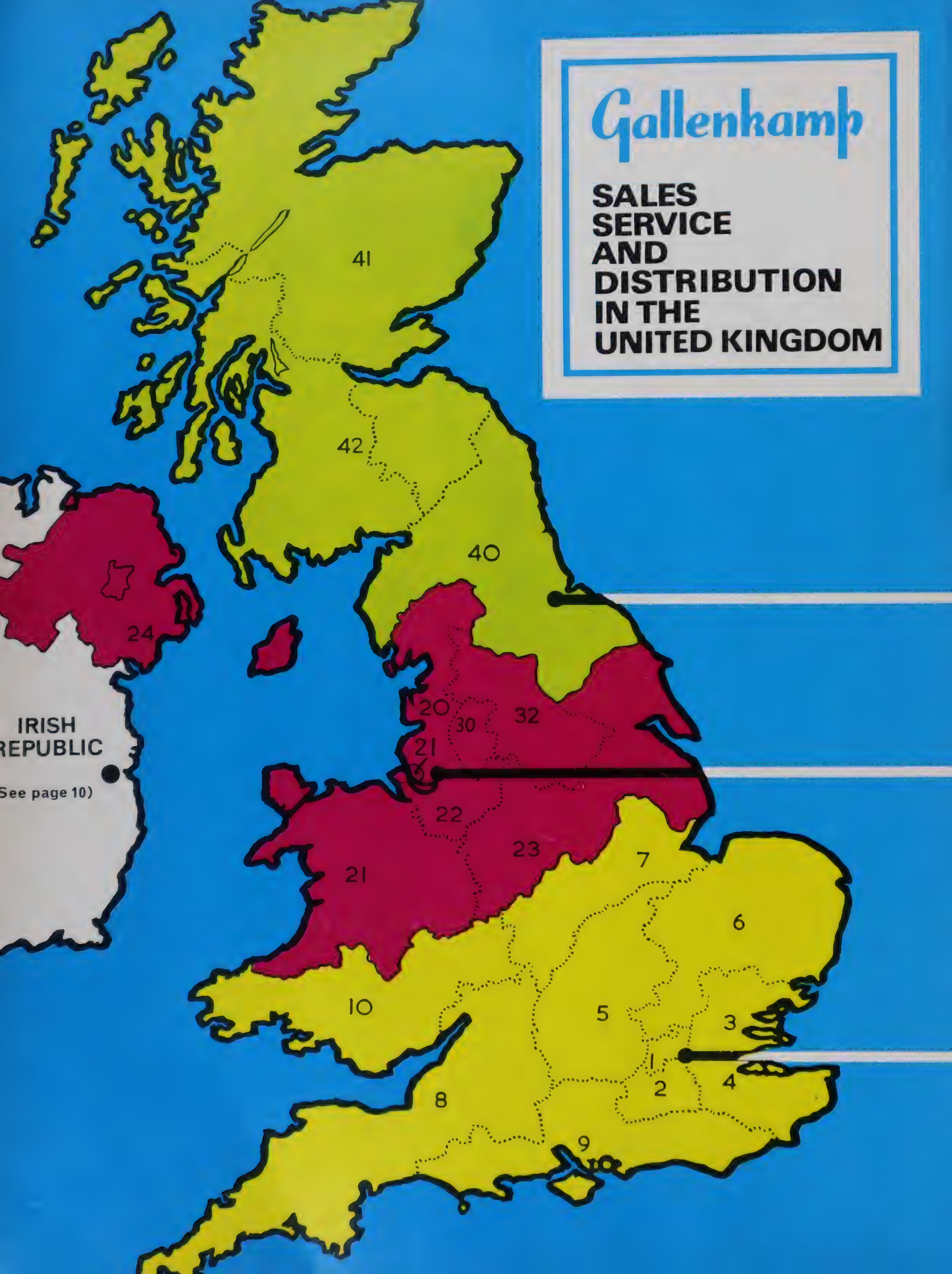
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IRISH
REPUBLIC
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Regular services at least once each week cover most of the country and, where demand warrants, a daily service is made to sections of some areas.

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. . . . . or to our Appointed Distributors overseas (see pages 10 and 11)

CONDITIONS OF SALE

All orders are accepted and goods supplied by us on the following terms and conditions:—

SECTION 1.

Applicable to all orders.

1.1. PRICES

All quoted and printed prices for goods are ex works and subject to alteration without notice; we reserve the right to invoice goods at our prices and the VAT rates ruling at the date of despatch.

1.2 QUANTITY RATES

Many articles are listed with two or more prices so as to offer a price advantage in favour of orders for larger quantities.

Quantity prices apply only to orders for the specified quantity or more. Pack prices apply only to one or more complete packs. Where part of a pack quantity is ordered the goods are charged at the higher rate applicable to small quantities.

Discounts based on 'Order value' or 'Quantity' are available in respect of several groups of goods. For details see page 14.

1.3. QUOTATIONS & INVOICES

All quotations are subject to confirmation by us, and we reserve the right to correct any accidental errors or omissions on quotations or invoices. Where all factors governing the price of the goods are under our direct control we will, unless otherwise stated, hold quoted prices firm if an order is received within 30 days from the date of the quotation.

1.4. DELIVERY

Whilst every effort is made to adhere to delivery dates, lateness or failure in delivery shall not entitle the Purchaser to cancel any Contract or hold up any payment. We shall not be under any liability for any loss, injury or damage caused by or consequent to any delay in delivery or non-delivery from any cause whatsoever. In particular deliveries offered ex stock are subject to the goods being unsold at the date of receipt of the Purchaser's order.

1.5 WARRANTY & RESPONSIBILITY

Subject to the due observance of any installation, operating or maintenance instructions, we warrant that we will replace or repair at our option free of charge any part or parts of goods of our own manufacture proved to our satisfaction to be defective owing to faults in workmanship or materials. If required by us, the Purchaser must return the goods to us, carriage paid, before a claim under this warranty can be accepted and if we opt to replace, the defective goods shall thereupon become our property. In the case of goods not manufactured by us the Purchaser shall be entitled only to such rights as we may be entitled to receive under any guarantee or warranty given to us in respect thereof. Any expense we may incur in enforcing such guarantee or warranty shall be for the account of the Purchaser. This Condition excludes every warranty, condition or liability not herein expressly set out and all liability for every form of consequential damage or loss and damage or loss caused by the act or neglect of us our servants or agents is hereby expressly excluded; provided that this condition shall only exclude or restrict the liability and remedy mentioned in Section 3 of the Misrepresentation Act 1967 to the extent therein mentioned.

1.6. REPAIRS

We are not responsible for damage occurring in transit to goods sent to us for repair or examination, nor for incidental damage to glass apparatus and delicate instruments in the course of repair howsoever caused. In the event of no order being placed we may charge for time involved in the preliminary examination and the reassembly of any article. Goods returned for repair should be sent carriage paid, and be clearly labelled with the sender's name and address, and at the same time a letter should be sent detailing the work required.

1.7. CATALOGUES, ETC.

Illustrations and descriptions of goods in our catalogues and other literature are believed to be correct at the date of going to press. Designs and sources of supply are however subject to alteration without notice and the right is reserved to fulfil orders by goods of the altered design or new source of supply. The contents and arrangements of all catalogues and other literature published by us are protected by Copyright and may not be reproduced or used in whole or in part without our specific permission.

Goods of foreign manufacture are identified by an asterisk preceding the catalogue number. Prices of such items include Customs and other charges unless otherwise specified.

1.8. LAW OF CONTRACT

The contract shall in all respects be construed and take effect in accordance with the laws of England.

CONDITIONS OF SALE

SECTION 2.

Applicable in addition to Section 1 to orders for delivery in the United Kingdom.

2.1. TERMS OF PAYMENT

Prices are strictly nett for prompt monthly payment and no deductions can be allowed. We retain the right to suspend deliveries or cancel any contract if the amount outstanding under this or any other Contract of the Customer is in excess of the credit we are willing to allow. Either a remittance or two approved trade references and a Banker's reference should accompany orders from customers who have no previous account.

2.2. CARRIAGE

Unless otherwise agreed and stated in writing in respect of individual transactions, the Company reserves the right to make a charge for carriage, irrespective of the mode of delivery. When a carriage charge is made, it will be shown on the invoice.

2.3. DAMAGE OR LOSS IN TRANSIT

No claims shall be made on us for breakage, loss or damage in transit, except where goods are conveyed by our own motor transport (which delivers over most of the country). Where goods are not conveyed by our own transport all goods shall be at the risk of the Purchaser or its consignee from the time they leave our premises or those of our agents. Both the Carriers concerned and ourselves must be advised in writing of shortages, errors, breakages loss or damage within three days of receipt of goods and of non-delivery within 14 days from date of advice of despatch. Any claim for shortages, errors or breakages, loss or damage in transit by our own transport must be so notified to us in writing within 3 days of receipt of the goods and any claim for non-delivery by our own transport must be so notified within 14 days from the date of advice of despatch. In the event of no such notification being received by us the goods shall be deemed to have been delivered complete and in compliance with the Contract requirements.

2.4. CASES AND CONTAINERS

Cases and other containers where chargeable will be invoiced to Customers unless returned in good condition and carriage paid to our warehouse within 60 days from receipt. Charges for cases or containers must not be deducted from our account unless a Credit Note for them has been issued. Contaminated containers are valueless and no credit can be given for them.

2.5. INSURANCE

If requested by the Purchaser or considered necessary by us we will effect insurance against transit risks at the cost of the Purchaser. We shall not be liable for failure to insure unless insurance was requested by the Purchaser. If we effect insurance we shall be under no liability to take proceedings for recovery of any loss or damage and if we do claim as agents for the Purchaser our responsibility shall be limited to accounting for any amount received by us and we may deduct any reasonable expenses incurred by us.

2.6. SALE OF POISONS

The sale of listed poisons is restricted by the Pharmacy and Poisons Act, 1933, and by the Poison Rules. We supply poisons only to persons requiring them (a) for use for resale in trade or business or (b) for scientific education or research. Poisons in the First Schedule to the Poison Rules are prefixed 'S.1' in our catalogues. For the purchase of these poisons a written order on the Purchaser's official order form is required, signed by the Purchaser, stating his name, address, trade, business or profession, and the purpose for which the poison is required.

SECTION 3.

Applicable in addition to Section 1 to orders for final delivery outside the United Kingdom.

3.1. CHARGES

(a) All cases and other containers, packaging costs, delivery to docks and airports, dock and airport dues, port rates and Customs entry, freight, insurance, agency fees and other charges which may be incurred are chargeable to the Purchaser unless expressly specified by us to the contrary.

(b) Quotations or proforma invoices submitted on an FOB basis are, unless otherwise specified, for delivery to London docks or London airport and include dock or airport charges. Deliveries to docks or airports other than London may be charged extra.

(c) Quotations or proforma invoices submitted on a C & F basis are for delivery to London docks or London airport and include in addition to FOB charges, despatch charges which include Customs entry, Bills of Lading and agency fees. Freight costs to the designated port or airport of destination will also be included.

(d) Quotations or proforma invoices submitted on a CIF basis will include all costs as for C & F offers plus insurance of the goods to the designated port or airport of destination.

Charges for any other special documentation requirement including Certificates of Origin and Consular invoices will be extra unless specifically stated by us to the contrary.

3.2. IMPORT LICENCES

Where restrictions on import into the country of destination are in force all orders must be accompanied by the number and date of expiry of a valid Import Licence.

3.3. TERMS OF PAYMENT

(a) **Orders from Purchasers in the United Kingdom.** Prices are strictly nett for prompt monthly payment and no deductions can be allowed. Either a remittance or two approved trade references and a Banker's reference should accompany orders from Customers who have no previous account.

(b) **Orders from Purchasers outside the United Kingdom.** Unless other arrangements are agreed and made in writing in approved cases, payment shall be by an irrevocable Letter of Credit confirmed by a London Bank. When an order is for a large number of items, the Letter of Credit should preferably allow for part payments and shipments. All expenses in respect of such payment must be discharged by the Purchaser.

3.4. DELIVERY

When we state a delivery time on our quotation, proforma invoice, acknowledgement of order, etc. it is to be understood that this is the time we estimate within which we can have the goods ready packed for shipment (please refer to Condition 1.4). Where the order requests us to apply for shipping instructions, instructions for delivery must be furnished to us within 30 days from the date of our application. We cannot accept any responsibility for delays in despatch caused through non-availability of shipping space or any other cause beyond our control.

Section 3 continued overleaf

CONDITIONS OF SALE

SECTION 3.

(Continued)

3.5. INSURANCE

(a) Cover. Unless we are specifically instructed otherwise goods **will be** insured under our Lloyds Marine Policy for the C.I.F. value plus 25% and the cost of such insurance will be charged to the Customer's account. We can accept no responsibility for goods shipped un-insured at the Customer's request.

(b) Claims. Claims against insurance effected by us under our Lloyds Marine Policy up to a value of £20 may not necessitate survey by Lloyds' agent. In the event of loss or damage resulting in a claim which may exceed £20 immediate notice should be given to the Lloyds' agent at the port or place where the loss or damage is discovered.

Customers' attention is drawn to the clauses on the back of the Certificate of Insurance issued by us referring to documentation of claims and liabilities of our carriers, bailees or other third parties.

Claims will be settled abroad by the nearest Lloyds' agent unless we are specifically instructed to claim in London. In such cases we will, if requested, supply free replacements to the value, at the C.I.F. prices and costs ruling at the date of despatch of the replacement, of the amount received from the Underwriters less reasonable charges for negotiating a claim, but we will be under no further liability other than that of accounting for any ultimate balance of the insurance money so received.

Where, at the Customer's request, insurance arrangements have been made other than for cover under our Lloyds' Marine Policy we shall not be obliged to claim in respect of damage or loss.

3.6. PACKING

We advise Purchasers to leave the packing of goods for export to our discretion. It will assist us if the following information is given when ordering :—

(a) Shipping Mark.
(b) Limits, if any, as to weight and size of packages.
(c) Directions as to route, e.g. by mail or other steamer, or by air.
(d) All information necessary to make Consular declarations.

3.7. DAMAGE OR LOSS IN TRANSIT

No claims shall be made upon us for breakage, loss or damage in transit unless the Purchaser establishes that it was due to neglect or unsuitable or insufficient packaging on our part. In any other case claims shall be made direct against the carrier or other person responsible.

3.8. SHORTAGES OR ERRORS

No claims can be entertained unless notification in writing together with a copy of the Carrier's delivery note is despatched to us within 3 days of the receipt of the goods by the Purchaser or consignee.

SECTION 4.

Discounts available on certain groups of goods.

In order to ensure recognition of these discounts and to facilitate accountancy it is recommended that such orders should be on a separate order sheet from other goods.

ORDER VALUE DISCOUNTS

Discounts based on the value of an order are applicable to certain groups of goods listed below.

Order value discounts apply to one order for one group of goods for delivery to one address in one consignment.

GROUP 1. TECHNICO, SINTAGLASS AND (AG) SCIENTIFIC GLASSWARE

(All goods listed with code letter 'a' following the price.)

Orders of £100·00 or over, list price value less 3%
" " £250·00 " " " " " 5%
" " £500·00 " " " " " 10%

GROUP 3. ROYAL WORCESTER LABORATORY PORCELAIN

Orders of £25·00 or over, list price value less 2½%
" " £50·00 " " " " " 5%
" " £100·00 " " " " " 7½%
" " £250·00 " " " " " 10%

QUANTITY DISCOUNTS

Discounts based on the quantity of goods on an order are applicable to certain groups of goods listed below.

GROUP 10. GALLENKAMP APPARATUS AND INSTRUMENTS

(All goods listed with code letters 'b' or 'g' following the price.)

For goods where an **each** price only is listed.

Quantity discounts in Group 10 apply to individual items on one order for delivery to one address in one consignment.

Order for 3 or 4 of an item less 3%
" " 5 to 9 " " " 5%
" " 10 or more " " " 10%

If a **10** price is listed, the discounts will be allowed respectively on 30, 50 and 100.

If a **100** price is listed, the discounts will be allowed respectively on 300, 500 and 1000.

GROUP 11. PYREX, QUICKFIT, E-MIL and CLEARFIT LABORATORY GLASSWARE

(All goods listed with code letter 'j' following the price.)

Quantity discounts in Group 11 apply to one order for one group of goods for delivery to one address in one consignment.

Order for 50 to 99 standard packages less 5%
" " 100 to 199 " " " 10%
" " 200 or more " " " 15%

GENERAL INFORMATION

PRICE STRUCTURE

Although costs in general continue to move upwards, we have been able to minimise price increases by rationalisation of products, by the use of modern design techniques and by improved methods and efficiency in our factories.

Economies have also been made in the warehousing, handling and distribution of goods, e.g. by pre-packing many small items and offering advantageous pack prices. The disproportionately high cost of handling low value and small quantity orders, however, remains a matter of concern.

Systems currently in use to offset these costs include a minimum value for acceptance of an order and a handling surcharge imposed on orders below a certain value. We have considered these but feel them to be unduly restrictive and incompatible with our aim to offer the service best suited to the requirements of our customers.

Instead we have introduced a price structure which retains the advantageous rates for packs and quantities, but in which the 'each' price becomes a progressively increasing fraction of the 'quantity' rate towards the lower end of the price scale. The impact of this only starts to become significant at prices below about £2·50 per ten.

This system is intended to encourage ordering in packs or quantities and we feel confident that customers will appreciate that the resulting economies will be of mutual benefit in the long run, enabling us to maintain quantity rates at the lowest economic level.

ELECTRICITY SUPPLIES

Voltage and frequency

Electrical apparatus manufactured by *Gallenkamp* is offered and labelled for one, or for a choice of two or more voltage ranges and, where necessary, frequencies of mains electricity supplies.

***Gallenkamp* cannot accept any responsibility for the correct operation of any such apparatus should it be connected to electricity supplies which are nominally outside or vary outside the stated voltage and frequency values for which it is designed.**

Power rating

Throughout this catalogue **maximum power rating** is included in the tabulated data. This is the maximum power that the apparatus will require for any combination of settings of its controls. The electricity supply outlet to which the apparatus is connected must have sufficient current carrying capacity to supply this power otherwise the mains installation may be damaged. Over a period of time the **actual power consumption** of an apparatus incorporating controls for temperature, motor speed, etc., will be normally very much less than the maximum rating. Values cannot be quoted for actual power consumption because they depend, for example, on the working temperature, ambient conditions and the manner of use of the apparatus.

REGISTERED TRADE MARKS

The following are Trade Marks registered by
A. Gallenkamp & Co. Ltd.

Gallenkamp

AG

Technico

Asda

Compenstat

CeCa

In addition the following descriptive names are used on certain individual products to identify manufacture by *Gallenkamp*

Autobomb

Economy

Handilab

Hotbox

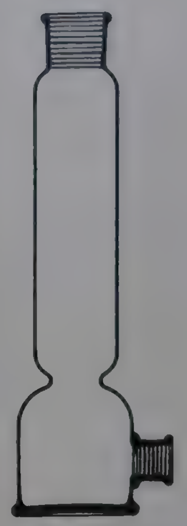
Hotspot

Lablox

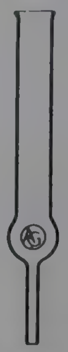
PEEL

SintAGlass

Thermo Stirrer



AB-525



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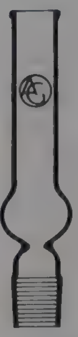

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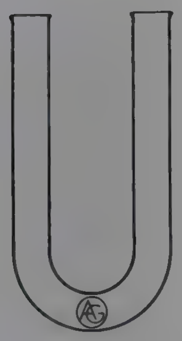

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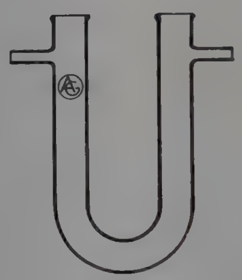

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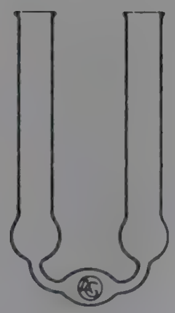

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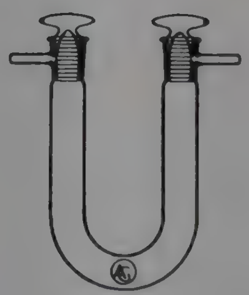


AB-665

PACKING MATERIALS FOR TOWERS AND TUBES

Glass balls see GR-100

Silica gel see DK-665

For details and prices see entries in List No. sequence.

SINTAGLASS GAS WASH BOTTLES

—capacities 125, 250 and 500 ml

—porosities 0, 1 and 2

For details and prices see GF-640 et seq. in List No. sequence.

AB-525

ABSORPTION TOWERS, borosilicate glass, with standard ground joints; neck 34/35 and outlet 14/23. **Without stopper or stopcock.**

Size	25×5	30×5 cm
Each	**£1·69**	**2·09**

ACCESSORIES

Q-MF 10/1B Adapter, joint 14/23 ... For details and prices see entries in *Quickfit* section.
Q-MF 11/1B Stopcock, joint 14/23 ...
Q-MF 10/5B Adapter, joint 34/35 ...
DK-469 Stopcock, joint 34/35. For details and price see entry in List No. sequence.

AB-600

ABSORPTION TUBES, Ⓐ, **straight form,** with one bulb and tube long enough for bending. The specified length excludes the narrow connecting tube.

Length	10	15	20 cm
Diameter	12	20	25 mm
Ten	**£1·00**	**1·40**	**1·55**
Each	**£0·17**	**0·21**	**0·22**

AB-620

ABSORPTION TUBE, Ⓐ, **straight form,** borosilicate glass, with bulb and 14/15 cone joint, for use as desiccant guard tube. Overall length 100 mm, internal diameter 10 mm ... ... Ten **£5·50** Each **£0·62**

AB-650

ABSORPTION TUBES, Ⓐ, **U shape,** plain form.

Length	10	12·5	15 cm
Diameter	12	15	20 mm
Ten	**£1·50**	**1·55**	**1·90**
Each	**£0·22**	**0·22**	**0·26**

AB-655

ABSORPTION TUBES, Ⓐ, **U shape,** with side arms.

Length	10	12·5	15 cm
Diameter	12	15	20 mm
Ten	**£2·10**	**2·20**	**3·20**
Each	**£0·27**	**0·28**	**0·38**

AB-660

ABSORPTION TUBE, Ⓐ, **U shape, Wohler,** with 3 bulbs. Length 15 cm, diameter 20 mm.
Ten **£4·80** Each **£0·53**

AB-665

ABSORPTION TUBES, Ⓐ, **U shape,** with side arms and two ground-in stopper stopcocks.

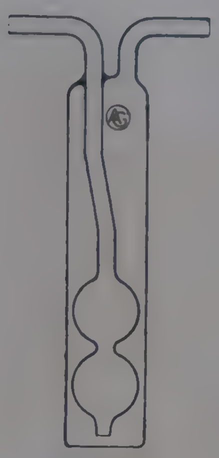
Length	100	125	150 mm
Diameter	12	15	20 mm
Ten	**£8·80**	**10·00**	**15·50**
Each	**£0·98**	**1·10**	**1·75**

AB-700

ABSORPTION TUBE, Ⓐ, **Arnold,** borosilicate glass, overall height 125 mm. Ten **£7·40** Each **£0·82** *ax*

AB-710

ABSORPTION TUBE, Ⓐ, **Midvale-Stetser Norton,** borosilicate glass, height 125 mm, ground-in stopper. Ten **£16·00** Each **£1·80** *ax*



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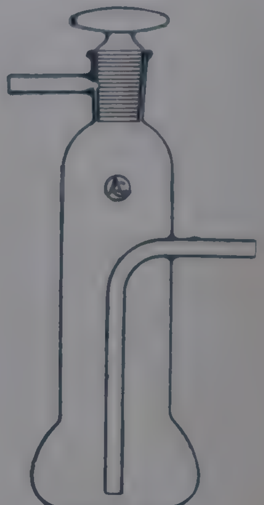


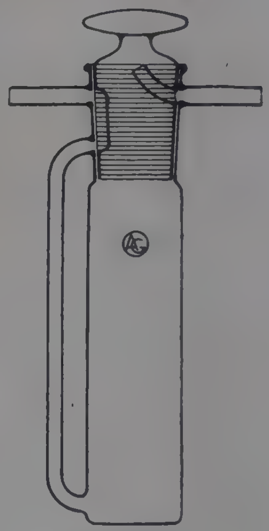
AB-710

AB-730

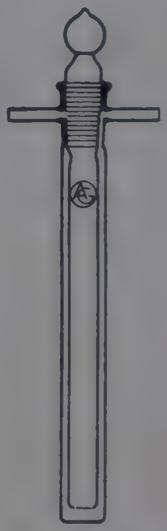
ABSORPTION TUBE, Ⓐ, **Nesbitt,** borosilicate glass, height 125 mm, capacity 50 ml ... ... Each **£3·70** *ax*

AB-750

ABSORPTION TUBE, Ⓐ, **Riley,** borosilicate glass, to BS 1016, Part 3, 200×20 mm, with concentric inner tube fitted with ground joint ... ... Each **£4·30** *ax*



AB-730



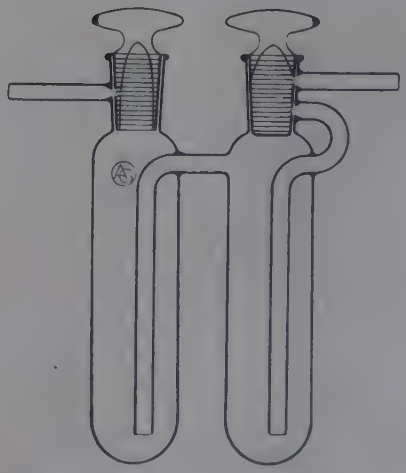
AB-750

AB-770

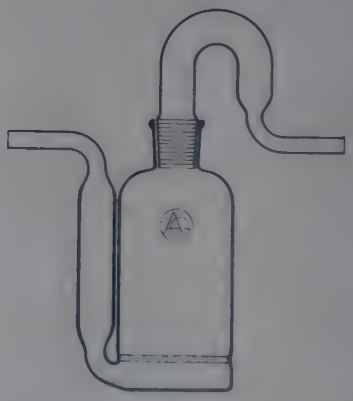
ABSORPTION TUBE, Ⓐ, **Blount,** as described by Haldane & Graham in 'Methods of Air Analysis', for absorption of moisture and carbon dioxide. Each **£7·40** *ax*

AB-800

ABSORPTION TUBE, Ⓐ, borosilicate glass, with sintered distributor plate 30 mm dia., porosity 2 with guard tube, cone and socket 12/14. Approximate weight 40 g, height 120 mm ... ... Each **£3·60** *ax*



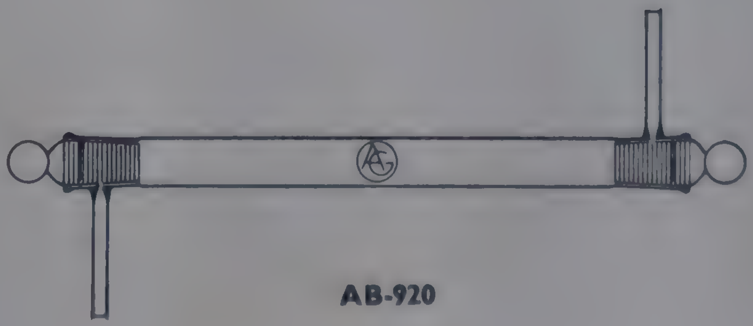
AB-770



AB-800

AB-920

ABSORPTION TUBE, Ⓐ, **Flaschenträger type,** soda-lime glass, with hollow blown stopper-stopcocks at each end. Dia. 10 mm, filling length 90 mm, overall length 145 mm. Weight 10 g. Ten **£32·00** Each **£3·60** *ax*



AB-920

ADHESIVES

The following table is a guide to the selection of adhesives for common applications. For special purposes preliminary trials may be necessary.

List No.	Description	Drying/setting time	Appearance of dry film	Bond withstands	Types of materials joined	Examples of applications
AE-040	Epoxy resin and hardener	12 hrs at 16°C ½ hr at 150°C	Amber, translucent, rigid	Water up to 100°C. Acid and alkali solutions. Dry heat to 150°C	Porous or non-porous rigid solids, thermosetting resins, etc.	Bonding ceramics, metal, glass, wood. Casting. Encapsulating
AE-050	Neoprene/resin solution impact adhesive. Ester/hydrocarbon solvent	10–35 minutes	Yellow/brown opaque flexible	Water. Acid and alkali solutions. Dry heat up to 60°C	Laminated and other rigid plastics to solid surfaces. Also fibrous materials	Bonding decorative laminates, PVC, etc. and thermoplastics *except* polythene, polypropylene and expanded polystyrene to metal, wood or board. Leather, fabrics. Unsuitable for use with cellulose paint
AE-084	Synthetic rubber/resin solution impact adhesive. Ketone solvent	5 to 10 minutes	Colourless, transparent, flexible	Water. Acid and alkali solutions. Dry heat up to 85°C	Porous or non-porous flexible or rigid solids	Bonding PVC, leather, fabrics, metal, glass, wood and thermoplastics *except* polythene, polypropylene and expanded polystyrene
AE-090	PVA emulsion in water	10–25 minutes	Colourless, translucent, semi-flexible	Dry heat up to 60°C	Natural or fabricated fibrous solids	Bonding wood, board, paper, fabrics, cork and expanded polystyrene
AE-200	Perspex (PMM) solution in chlorinated hydrocarbon	Initial setting: 3 hours, full hardness: 2 weeks at 25°C or 6 hours at 60°C	Colourless, transparent	Water. Acid and alkali solutions. Dry heat up to 70°C	Perspex, Plexiglas, Diakon and other forms of PMM (Acrylic) plastics	Assembly of fabrications from sheet, mouldings, tubing of PMM

AE-040

ADHESIVE, *Araldite*, with properties as tabulated above. Supplied in a pack containing a tube of resin, a tube of hardener, and instructions for use ... Pack **£0·30** *mx*

AE-050

ADHESIVE, *Evo-stick*, with properties as tabulated above. Supplied in small collapsible tube. With instructions for use ... ... Each **£0·20** *cx*

AE-084

ADHESIVE, *Bostick* **clear,** with properties as tabulated above. Supplied in small collapsible tube. Each **£0·13** *mx*

AE-090

ADHESIVE, *Evo-stick* **Resin W,** with properties as tabulated above. Supplied in plastics dispenser bottle containing 122 g ... ... Each **£0·17** *mx*

AE-200

ADHESIVE, *Perspex*, with properties as tabulated above. Supplied in tin containing 10 fl oz ... Each **£0·70** *cx*

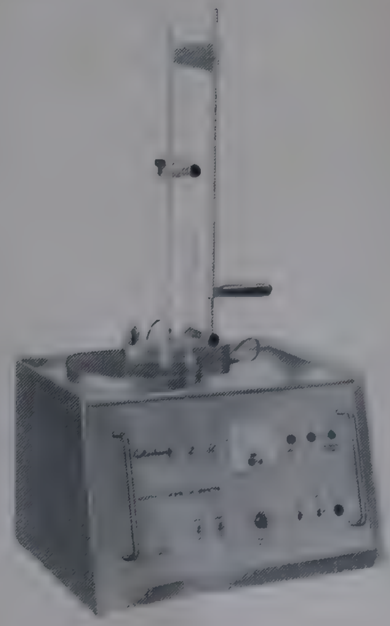
VB-886

APIEZON GREASE W. Suitable for making gas tight connections in combustion trains, etc. For details and price see entry in List No. sequence.

Gallenkamp ADIABATIC BOMB CALORIMETER

REGD TRADE MARK

For rapid accurate determination of calorific value of fuels and biological materials.



- **Top cover assembly on telescopic lift—no dismantling between tests.**
- **Swing down control panel for immediate access for servicing.**
- **Console encloses calorimeter and all control circuits cables and water connections.**

For full details see CB-100 to CB-353 in List No. sequence.

AIR PUMPS

AF-320

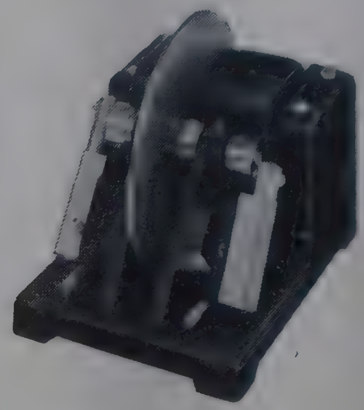
AIR PUMP, hand operated, compression and exhaust, with barrel 17·5×3 cm and corrugated nipples for tubing connection ... ... Each **£7·50** *cx*

AF-380

AIR PUMP, piston type, for general aerating purposes. The pump is driven by a sturdy rotating disk 20W induction motor, and is very quiet in operation. Solid bearings and a ringed, self-lubricating double acting piston ensure trouble-free continuous running. The output of the pump is about 0·75 l/min at 0·4 kgf/cm². For 230/250V 50 Hz single phase supplies.
Each **£6·90** *fx*

AF-385

AIR PUMP, piston type, for general aerating purposes, similar to AF-380 but with twin double acting pistons and outlets arranged for both suction and pressure. The output from the pump is about 1·4 l/min. For 230/250V 50 Hz single phase supplies ... Each **£9·25** *fx*


AF-385
(AF-380 is similar)

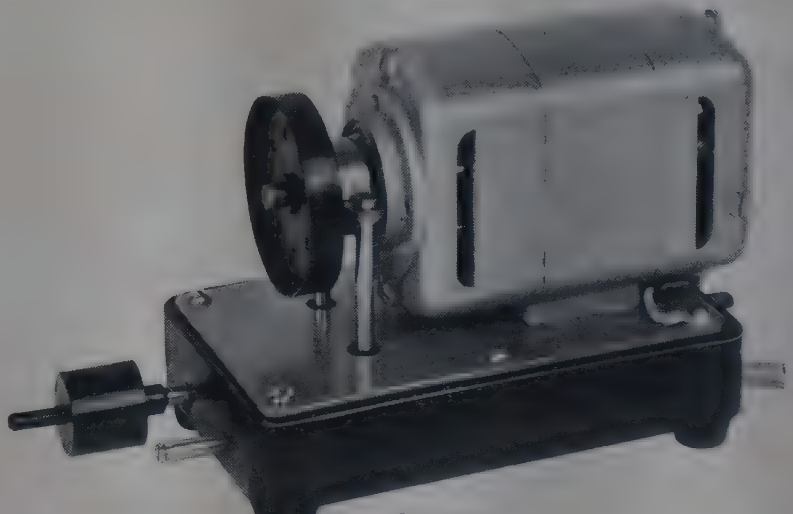
AF-320

AF-400

AF-400

AIR PUMP, diaphragm type, for general aerating purposes. A quiet running pump operated by a solenoid and fitted with a neoprene diaphragm. Output is about 1·5 l/min free air, maximum pressure 0·15 kgf/cm². In moulded plastics case mounted on foam rubber. For 200/240V a.c. single phase supplies, consumption 3 watts.
Each **£1·42** *mx*

REPLACEMENT PART
AF-401 **Diaphragms,** pack of 3.
10 packs **£0·80** Pack **£0·15** *mx*

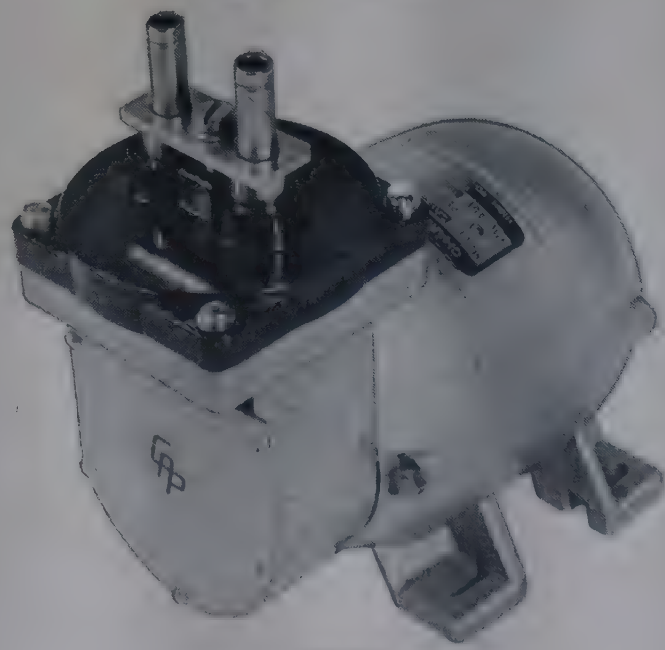

AF-410

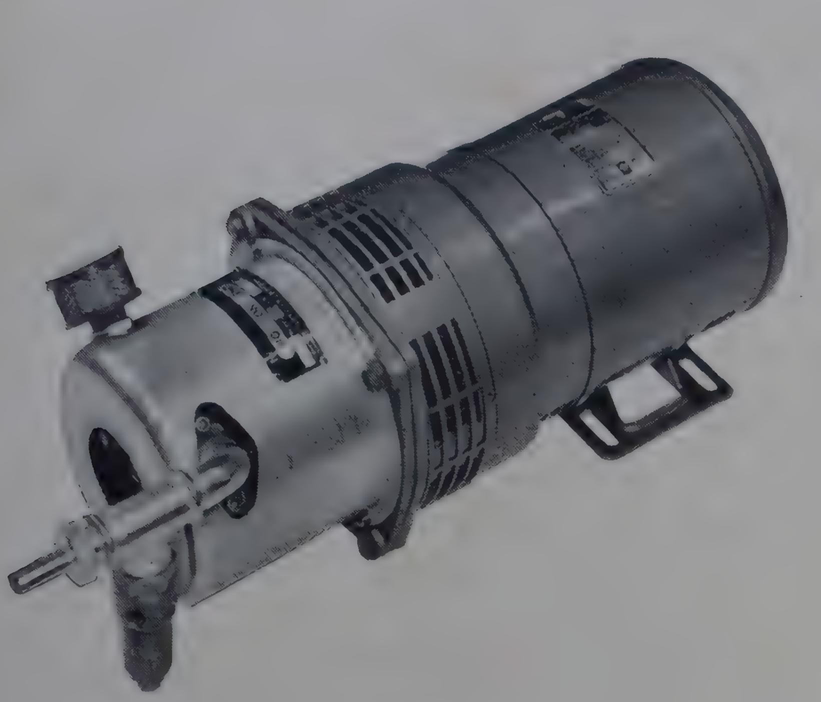
AF-410

AIR PUMP, diaphragm type. The neoprene diaphragm is operated by connecting rods from a grease packed ball race eccentric on the motor shaft. It is very quiet in operation, compact and reliable. Can be used for pressure or suction to 350 torr with an output of 5 l/min free air. Fitted with motor, speed control rheostat in base, inlet filter and 5 mm o.d. outlet nozzle. For 220/240V 50 Hz single phase supplies ... ... Each **£15·20** *fx*

AF-414

AIR PUMP, diaphragm circulating type. Particularly suitable for closed circuit circulation of air or gases. The diaphragm and disk valves are of neoprene and the pump head of phenolic resin with nickel plated connecting tubes. Pumping speed is 6 l/min on open circuit. Mounted direct on motor. For 220/240V 50 Hz single phase supplies.
Each **£17·00** *fx*


AF-414



AF-425

AF-425

AIR PUMP, dry rotary. A non-lubricated air cooled rotating vane pump which delivers **oil free air** and is suitable for long periods of operation. The pump must not be oiled or greased and the sealed bearings require no attention. Integral with the pump is a ventilated $\frac{1}{2}$ hp split phase motor running at approximately 1425 rev/min. A protective thermal cut-out with manual reset is incorporated in the motor body. Complete with air inlet filter, pressure relief valve set at 0·7 kgf/cm², outlet nozzle suitable for 12·5 mm bore flexible tubing and instructions for use.

Technical Data

Maximum pressure	0·7 kgf/cm²
Displacement, maximum	210 l/min
Displacement, at 0·7 kgf/cm²	140 l/min
Overall dimensions	45 × 20 × 20 cm high
Weight, net	8·5 kg

For 220/240V 50 Hz single phase supplies.

Each **£98·00** *mx*

COMBINED COMPRESSOR/VACUUM PUMPS

AF-430

AIR PUMP, *Edwards* **ECB1.** A non-lubricated rotating carbon vane pump which delivers **oil free air** and is suitable for long periods of operation. The pump must not be oiled or greased. Directly coupled to the pump is a $\frac{1}{6}$ hp motor running at approximately 2850 rev/min. Complete with air filter/silencer, pressure relief valve and inlet and outlet riffled nozzles suitable for 8 mm bore flexible tubing.

Technical Data

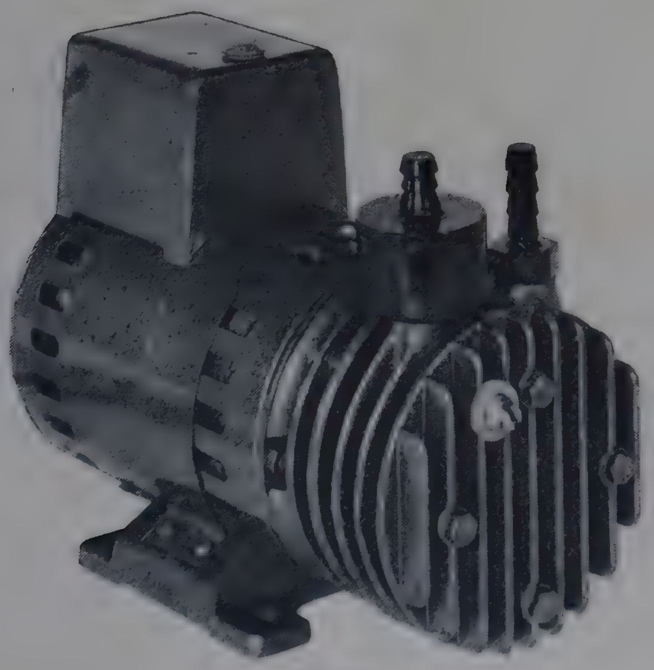
Maximum pressure	1 kgf/cm²
Vacuum	125 torr
Displacement	28 l/min
Overall dimensions	11 × 21 × 17 cm high
Weight, net	4·5 kg

For 220/240V 50 Hz single phase supplies.

Each **£39·70** *fx*

ACCESSORIES

AF-432	Combined pressure gauge and non-return valve.	Each £6·30 *fx*
AF-437	Combined vacuum gauge and non-return valve.	Each £6·30 *fx*



AF-430

OTHER PUMPS

AIR BELLOWS	see BK-620
CARBOY	see CC-932
FILTER	see FD-210 et seq.
HIGH VACUUM	see VB-042 et seq.
PERISTALTIC	see WM-200 et seq.
WATER and CHEMICAL	see WM-050 et seq.

For details see entries in List No. sequence.

COMBINED COMPRESSOR / VACUUM PUMPS

AF-445

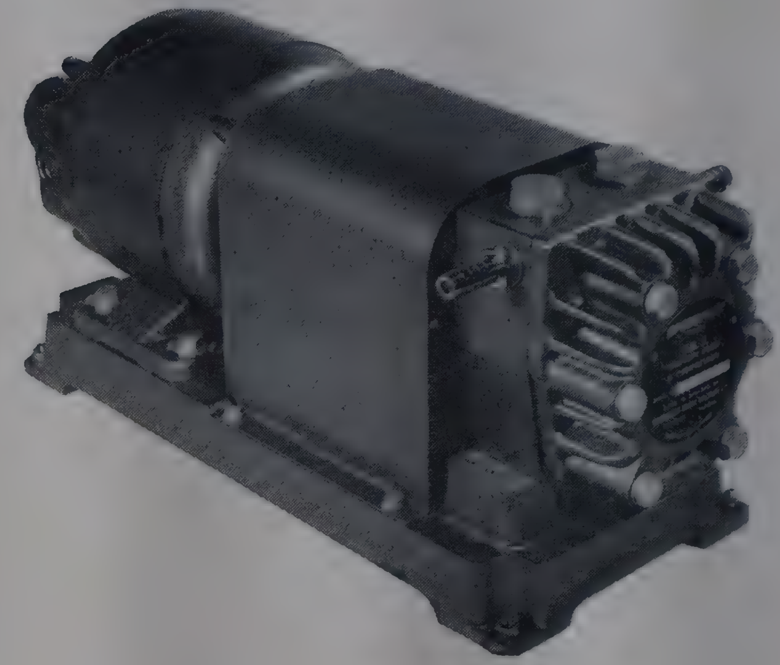
AIR PUMP, *Edwards* **EB3.** An oil lubricated pump mounted on base with directly coupled $\frac{1}{3}$ hp motor suitable for long periods of operation. With pressure relief valve and riffled inlet and outlet nozzles, suitable for 8 mm bore flexible tubing.

Technical Data

Maximum pressure	1·3 kgf/cm^2
Vacuum	100 torr
Displacement	71 l/min
Overall dimensions	19×44×22 cm high
Weight, net	23 kg

For 220/240V 50 Hz single phase supplies.

Each **£54·00** *fx*



AF-445

ACCESSORIES

AF-447	**Oiler baffle**	Each **£9·55** *fx*
AF-432	**Combined pressure gauge and non-return valve**	For prices see entries in List No. sequence.
AF-437	**Combined vacuum gauge and non-return valve**	
LX-130	**Pump oil**	

PUMP TROLLEYS

For trolleys which can be used to provide mobile pumping systems see FV-254, FV-257 and VB-480 in List No. sequence.

AF-458

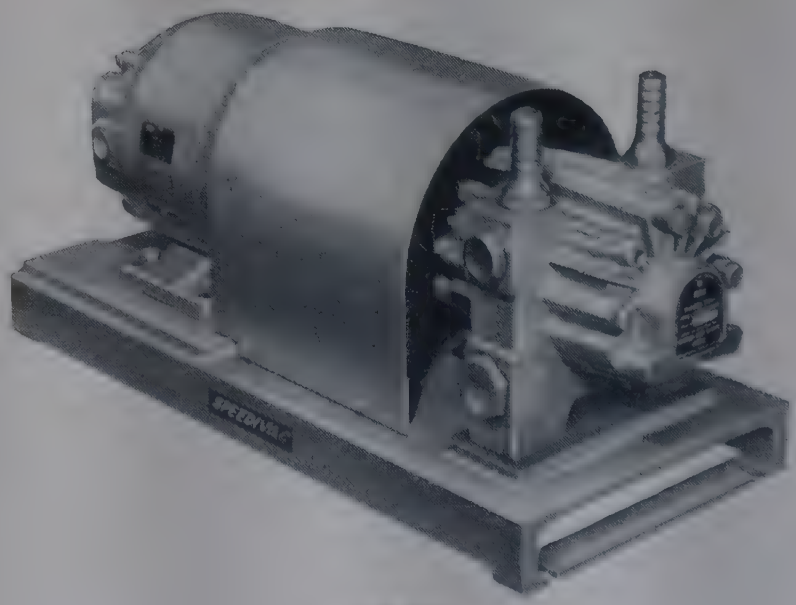
AIR PUMP, *Edwards* **RB5,** mounted on base with $\frac{1}{2}$ hp motor. Complete with adjustable relief valve and inlet and outlet nozzles suitable for 12 mm bore flexible tubing.

Technical Data

Pressure	1·0 kgf/cm^2 continuous 1·4 kgf/cm^2 intermittent
Vacuum	125 torr
Displacement	160 l/min
Overall dimensions	19×53×25 cm
Weight, net	30 kg

For 220/240V 50 Hz single phase supplies.

Each **£89·35** *fx*

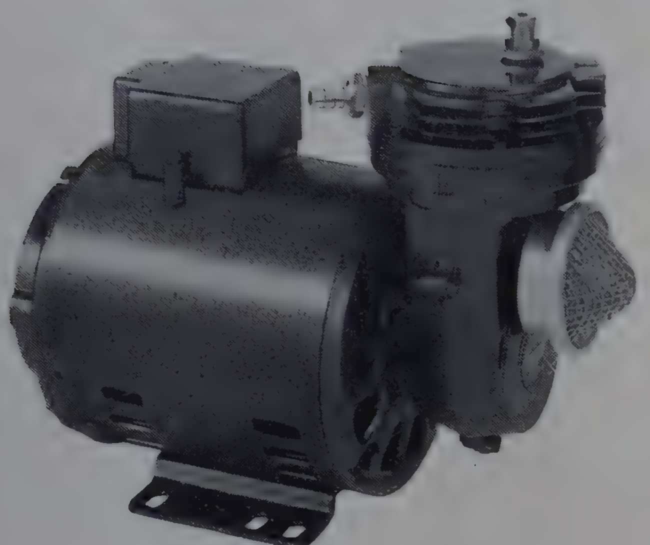


AF-458

ACCESSORIES

AF-471	**Combined pressure gauge and non-return valve.**	Each **£7·35** *fx*
AF-475	**Combined vacuum gauge and non-return valve.**	Each **£7·35** *fx*
AF-447	**Oiler baffle**	For prices see entries in List No. sequence.
LX-130	**Pump oil**	

COMBINED COMPRESSOR / VACUUM PUMPS



AF-512

AF-512

AIR PUMP, diaphragm. A quiet low vibration, **oil free** pump suitable for long periods of operation and **especially suitable for use with flame photometers.** The air output, which can be adjusted from 0 to 1·4 kgf/cm² by means of the pressure relief valve, is relatively pulse free as a result of the short pump stroke.

The large diameter air inlet filter can be removed to enable the pump to be used for vacuum purposes. The outlet nozzle accepts 6·5 mm bore heavy wall flexible tubing. Motor rating $\frac{1}{12}$ hp.

Technical Data

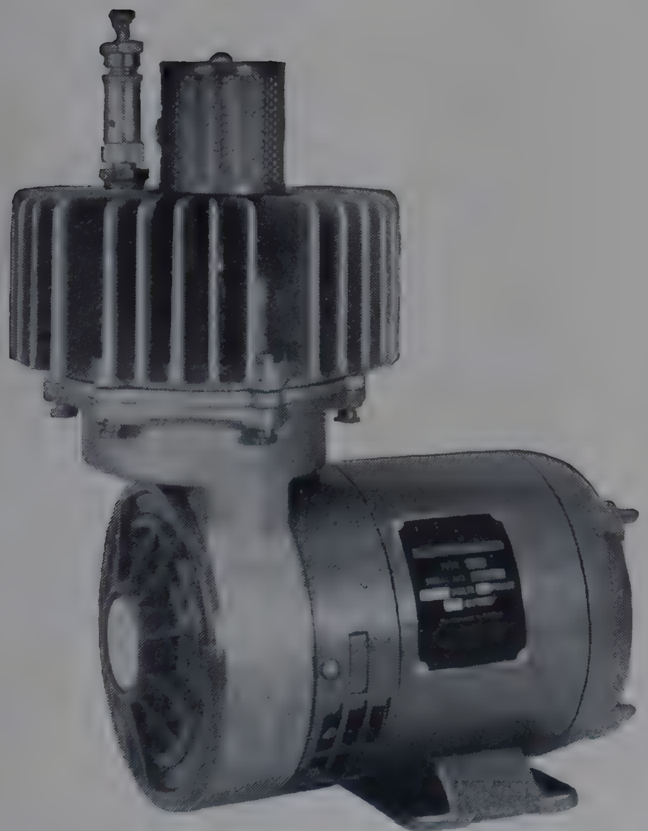
Maximum pressure	1·4 kgf/cm²
Vacuum	200 torr
Displacement, maximum	22 l/min
Displacement, at 1·4 kgf/cm²	11 l/min
Overall dimensions	25 × 12 × 20 cm high
Weight, net	6 kg

For 220/240V 50 Hz single phase supplies. Each **£31·00** *mx*

Gallenkamp
REGD TRADE MARK

FLAME ANALYSER

For flame photometric determinations of sodium, potassium and calcium—see FH-500 in List No. sequence.



AF-535

AF-535

AIR PUMP, diaphragm, for **oil free** delivery up to 4·2 kgf/cm². Motor, rating $\frac{1}{4}$ hp, and pump are fitted with ball bearings requiring only intermittent attention.

A pressure regulating/safety valve is fitted, with a relief valve for easy starting when pressure remains in the line. The pressure outlet has a male $\frac{1}{4}$ in BSP thread, which can be replaced by the $\frac{1}{2}$ in (12·5 mm) hose connector supplied. The air inlet filter can be removed and replaced by the hose connector to enable the pump to be used for vacuum purposes.

Technical Data

Maximum pressure	4·2 kgf/cm²
Displacement at 3 kgf/cm²	30 l/min
Vacuum	150 torr
Overall dimensions	32 × 20 × 40 cm high
Weight, net	19 kg

For 220/240V 50 Hz single phase supplies. Each **£74·00** *mx*

For electrically operated **FILTER PUMP** see FD-251 in List No. sequence.

ALUMINIUM FOIL

Suitable for many purposes in the laboratory, including sealing bottles and culture tubes, stopping leaks, reducing evaporation, covering corks, for thermal insulation or making small weighing boats or dishes. Can easily be labelled with chinagraph pencils, etc.

AL-100

ALUMINIUM FOIL, 7·5 cm wide in roll of 120 metres.
Each **£1·40** *cx*

AL-105

ALUMINIUM FOIL, 45 cm wide in roll of 75 metres.
Each **£2·80** *cx*

ACCESSORY for AL-105

AL-107 **Holder,** wall mounting, with cutting edge.
Each **£0·90** *cx*

ARSENIC DETERMINATION

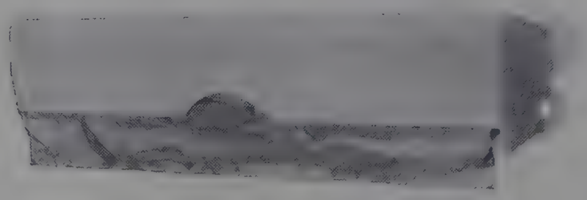
AP-350

ARSENIC TEST APPARATUS, Gutzeit, to BP specification. Comprises test bottle, delivery tube and rubber test paper holder with clip.
Ten **£10·00** Each **£1·12** *bx*

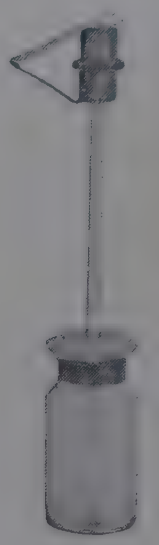
REPLACEMENT PART

AP-352 **Delivery tube** ... ... Each **£0·20** *ax*

AMMETERS see ELECTRICAL INSTRUMENTS
APRONS see CLOTHING, protective
AQUARIA see BIOLOGICAL SCIENCES



AL-107 with AL-105



AP-350

ASBESTOS GOODS

Attention is drawn to Asbestos regulations 1969 (S1 1969 No. 690) covering the storage, distribution and handling of asbestos materials and articles. Copies of the Regulations are obtainable from Her Majesty's Stationery Office.
The asbestos goods listed below are available only in the packs and dimensions stated.

AR-430

ASBESTOS CLOTH, commercial white, approximately 100 cm square by 1·5 mm thick ... Each **£4·50** *cx*

AR-460

ASBESTOS FILTER FIBRE, for use in Gooch crucibles. In pack containing 100 g ... Each **£0·55** *cx*

AR-470

ASBESTOS MILLBOARD, in sheets approximately 100 cm square.

Thickness	5	6 mm	
Each	**£1·95**	**2·30**	*cx*

See Note above.

AR-472

ASBESTOS MILLBOARD, cut in squares, approximately 3 mm thick. In packs containing 10 squares.

Sizes of square	15	30 cm	
10 packs	**£7·40**	**20·50**	*cx*
Pack	**£0·82**	**2·30**	

AR-490

ASBESTOS PAPER, commercial white, 100 cm wide, 0·4 mm thick. In wrapped reel of approximately 5 metres.
Reel **£1·20** *cx*

See Note above.

AR-500

ASBESTOS PAPER TAPE, commercial white. 0·4 mm thick. In wrapped reel of approximately 145 metres.

Width	25	50 mm	
Reel	**£1·00**	**1·75**	*cx*

See Note above.

AR-505

ASBESTOS WOVEN TAPE, commercial white. Width 25 mm, thickness 1·5 mm. In wrapped reel of approximately 10 metres.
10 reels **£20·00** Reel **£2·25** *cx*

AR-540

ASBESTOS YARN, commercial white. In 1 lb (450 g) wrapped reels.

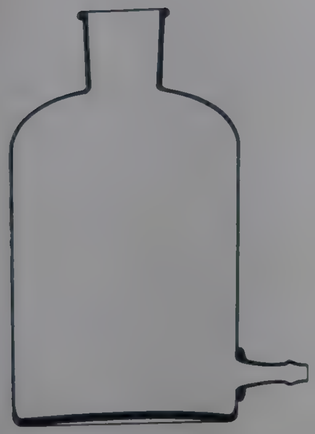
Diameter	4·5	6 mm	
Ten	**£7·60**	**7·60**	*cx*
Each	**£0·84**	**0·84**	

SU-800

STOPPERS, silicone rubber, for use up to approximately 250°C. For details and prices see entry in List No. sequence.

ASBESTOLITE SHEETS	see	FURNITURE
ASBESTOS boards	see	PE-784
filter sheets	see	FD-438
gloves	see	CLOTHING, protective
wire gauze	see	GAUZES

GLASS ASPIRATORS

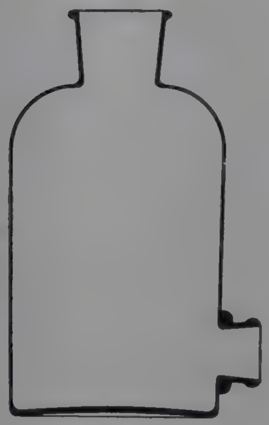


AU-340

AU-340

ASPIRATOR BOTTLES, *Pyrex* glass, with tubulure at bottom for rubber tubing connection.

Capacity	250	500	1000	2000 ml	
Std. pack qty.	12	12	12	6	
Std. pack	**£9·20**	**13·70**	**15·90**	**10·00**	*jx*
Each	**£0·86**	**1·30**	**1·50**	**1·80**	



AU-342

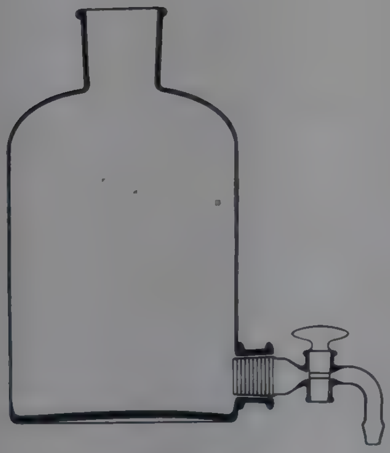
AU-342

ASPIRATOR BOTTLES, *Pyrex* glass, with moulded outlet for rubber stopper.

Capacity	2	5	10	20 litres	
Std. pack qty.	2	2	1	1	
Std. pack	**£4·80**	**6·55**	**5·35**	**7·85**	*jx*
Each	**£2·50**	**3·40**	—	—	

For suitable rubber stoppers see SU-760 to SU-800, Size No. 27, in List No. sequence.

For stopcocks for use in rubber stoppers see ST-420 in List No. sequence.

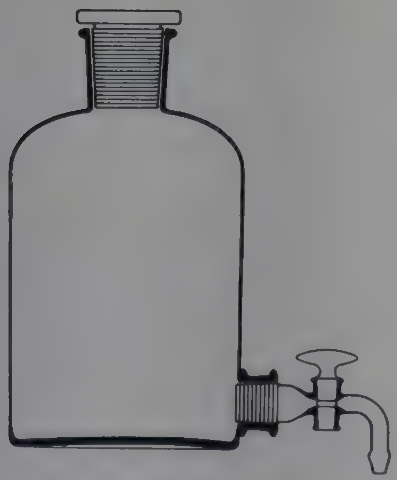


AU-344

AU-344

ASPIRATOR BOTTLES, *Pyrex* glass, with moulded outlet fitted with ground-in glass stopcock, standard joint 29/32.

Capacity	2	5	10	20 litres	
Std. pack qty	2	2	1	1	
Std. pack	**£8·35**	**11·75**	**7·85**	**10·55**	*jx*
Each	**£4·30**	**6·00**	—	—	



AU-346

AU-346

ASPIRATOR BOTTLES, *Pyrex* glass, with moulded outlet fitted with ground-in glass stopcock, standard joint 29/32 and stoppered neck.

Capacity	2	5	10	20 litres	
Std. pack qty.	2	2	1	1	
Std. pack	**£10·15**	**14·30**	**9·60**	**13·60**	*jx*
Each	**£ 5·20**	**7·40**	—	—	

REPLACEMENT STOPCOCK for AU-344 and AU-346

AU-348 **Stopcock,** borosilicate glass, 29/32 cone.
Std. pack of 2 **£3·50** Each **£1·80** *jx*

ACCESSORY STOPCOCKS for AU-344 and AU-346

AU-367 **Stopcock,** *Flexicon,* borosilicate glass with two PVC rings around joint to give a degree of flexibility. Suitable for 29/32 socket ... Ten **£20·50** Each **£2·28** *fx*

AU-447 **Stopcock,** polythene, 12 mm bore. For details see entry in List No. sequence.

Gallenkamp MANUFACTURE:
REGD TRADE MARK

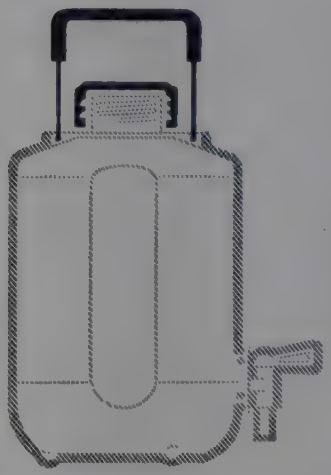
Technico	**Volumetric Glassware** including: burettes, cylinders, density bottles, flasks, pipettes and viscometers.
AG	**Benchblown Glassware** including: condensers, fractionating columns, Soxhlet extractors and stopcocks.
SintAGlass	**Sintered Glassware** including: crucibles, filters, funnels, gas distributors and plates.

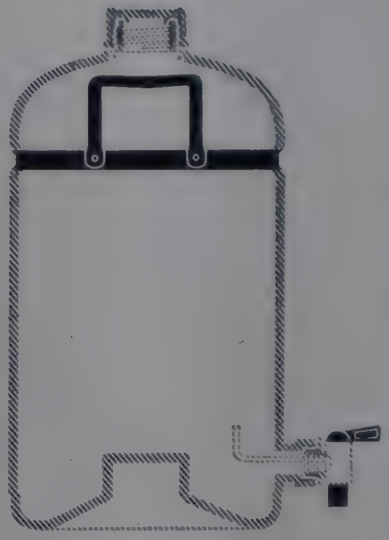
PLASTICS ASPIRATORS

AU-425

ASPIRATOR BOTTLES, rigid polythene, with permanently fitted 8 mm bore stopcock, screw-on cap and plastics covered handle hinged at the neck.

Capacity	2·5	4·5	9 litres	
Each	£2·00	1·75	1·80	*cx*


AU-425


AU-430

***AU-430**

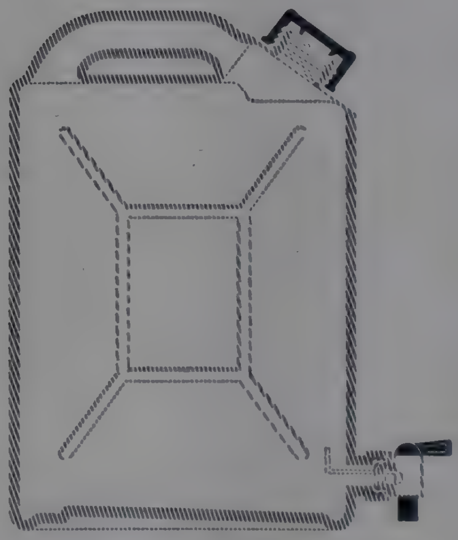
ASPIRATOR BOTTLES, thick polythene, with interchangeable air-vented 12 mm bore stopcock, 5 cm diameter neck with screw-on cap and plastics covered band around shoulder incorporating lifting handles.

Capacity	15	20	25	30	40	60 litres	
Each	£5·40	6·00	6·60	7·00	8·10	10·10	*mx*

AU-440

ASPIRATOR BOTTLES, thick polythene, rectangular, with interchangeable air-vented 12 mm bore stopcock on the narrow side, screw-on cap, and carrying handle.

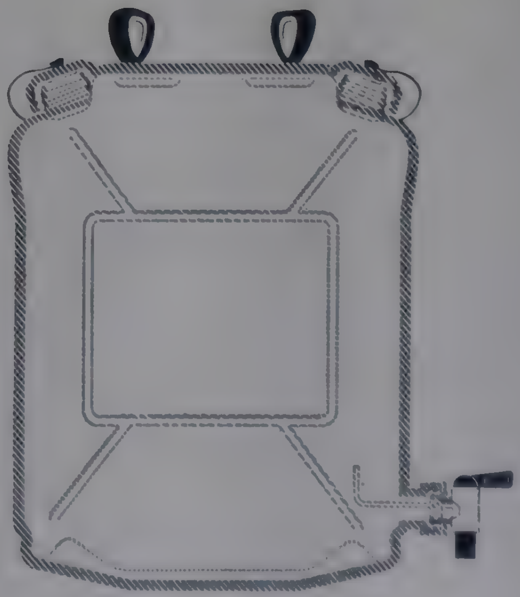
Capacity	25	45 litres	
Width	23	27 cm	
Depth	31	39 cm	
Each	£4·50	6·30	*mx*


AU-440 (25 litre)

REPLACEMENT PART for AU-430 and AU-440

AU-447	**Stopcock,** polythene, 12 mm bore with air vent tube. Suitable for 29/32 socket outlets.	Ten	£2·40	Each	£0·30	*cx*

PLASTICS BOTTLES
for
Large capacity storage
see
BT-500 et seq. in List No. sequence.

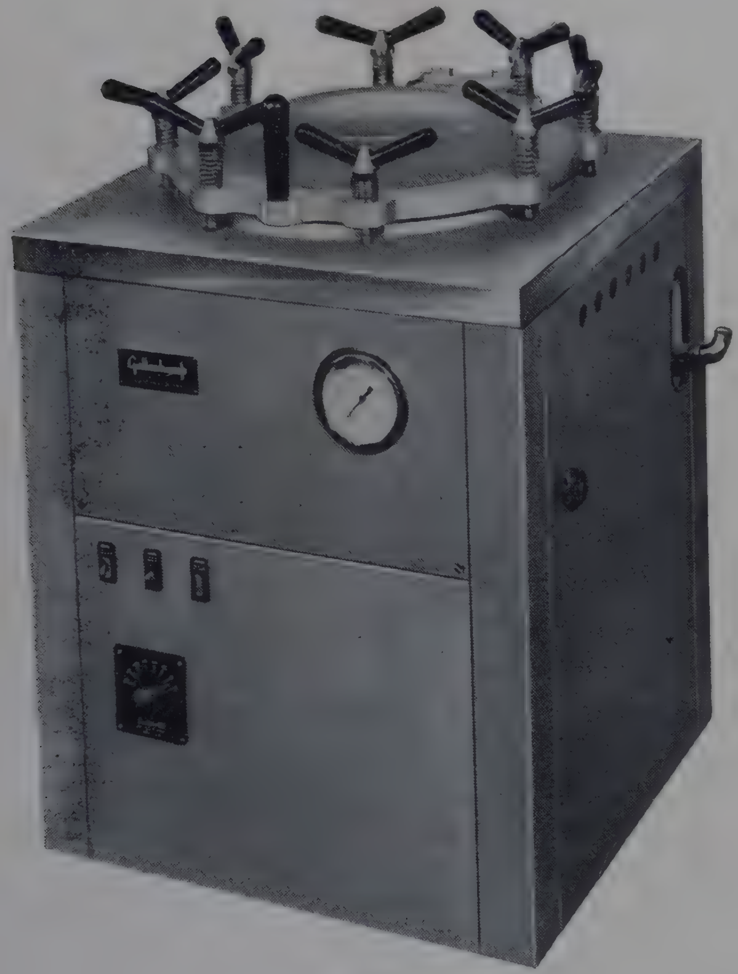

AU-440 (45 litre)

Gallenkamp BS AUTOCLAVES

REGD TRADE MARK

FOR ELECTRIC, GAS OR STEAM HEATING

For the steam sterilisation of surgical instruments, dressings and biochemistry equipment.



AX-100

PERFORMANCE AND DIMENSIONS

Maximum working pressure	2·1 kgf/cm^2 (30 lbf/in^2)	
Typical heating times	20–100°C	100–130°C
AX-100	25 min	10 min
AX-110	25 min	12 min
AX-120	Depends on steam supply. Normally about 10 mins to 130°C	
Working depth of boiler	46·0 cm	
Internal diameter of boiler	45·8 cm	
	H W D	
Overall dimensions of autoclave	160×80×100 cm with lid open	
Drain outlet diameter	13 mm	

All boilers are pressure tested during manufacture. Each autoclave is tested under working conditions before despatch and a certificate is supplied giving essential details of construction and tests.

DESIGN APPROVED BY ASSOCIATED OFFICERS TECHNICAL COMMITTEE FOR INSURANCE PURPOSES

- **Reliable and easy to handle**
- **Automatic air vent and safety valve**
- **Thermostatic control of steam temperature within ±1degC**
- **Sturdily engineered for long life**
- **Outer case remains cool during operation**
- **Optionally available to meet BS 2646 specification**

OPERATION AND DESIGN

Electrically heated models

Temperature is controlled by a direct reading thermostat calibrated 100 to 135°C, which switches a 6 kW immersion heater by means of a power relay. Indicator lamps show when the mains and heater are ON.

This model must be connected to a 30A mains electricity switched outlet for 200/240V supplies or a 60A outlet for 110/120V supply. A terminal block is provided for connecting suitable cable.

Gas heated models

Heating is by a high efficiency burner fitted with a gas governor which corrects for fluctuations in gas supply pressure. The gas is ignited by a press button device which is powered from the mains electricity supply; the device also incorporates an automatic flame failure system. Temperature is controlled by means of a thermostat. Combustion products leave through a chimney to which a flue pipe may be connected. Coal gas consumption is approximately 2 m^3/hr (70 ft^3/hr) maximum.

Steam heated models

Heating is by direct steam injection into the boiler. Maximum steam consumption is about 9 kg (20 lb) per hour. A steam trap is fitted to drain the condensate automatically.

Gallenkamp BS AUTOCLAVES

GENERAL CONSTRUCTION (ALL MODELS)

The case is made of rigid steel and is mounted on castors for easy movement. The top is stainless steel and all remaining steelwork is rustproofed with exterior surfaces finished in stoved grey enamel.

The boiler is formed from heavy gauge copper with all seams welded, and has a cast gunmetal top rim recessed to accept a rubber gasket. All internal surfaces are heavily tinned.

The cover is a light alloy casting, hinged at the rear and fitted with a lifting handle in front. It is secured by steel captive bolts fitted with plastics hand grips. A spring lifts each bolt away from the boiler when released, so preventing accidental damage when the cover is lowered.

The steam fittings connected to the boiler comprise a pressure gauge, stop valve, adjustable safety valve and automatic air vent. A thermometer pocket between the boiler and the air vent enables the autoclave temperature to be measured with a thermometer. The safety valve is an approved type the setting of which can be locked with the padlock supplied. It is fitted with an easing lever.

A water level indicator and steam leak are specified in BS 2646 but are not always required in use. Alternative models are listed below with and without these fittings as appropriate.

NOTE: Autoclaves AX-100 to AX-111 can be fitted with a low water cut-out and with timing controls to govern period of autoclaving. Quotation on receipt of full details of requirements.

AX-100

AUTOCLAVE, *Gallenkamp*, **vertical type, electrically heated,** as specification, with 6kW heater, automatic air vent, thermostat, pressure gauge, safety valve, steam exhaust system and certificate of test. **Without basket or mains electricity cable.** For a.c. single phase supplies.

For 220/240V	Each	**£793·00** *bxN*
For 200/210V	Each	**£812·00** *bxN*
For 110/120V	Each	**£812·00** *bxN*

AX-101

AUTOCLAVE, *Gallenkamp*, **to BS 2646,** as AX-100 but including steam leak and water level indicator. For a.c. single phase supplies.

For 220/240V	Each	**£844·00** *bxN*
For 200/210V	Each	**£863·00** *bxN*
For 110/120V	Each	**£863·00** *bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART for AX-100 and AX-101

AX-104	**Immersion heater**	Each	**£12·00** *bx*

AX-110

AUTOCLAVE, *Gallenkamp*, **vertical type, gas heated,** as specification, with automatic air vent, thermostat, pressure gauge, safety valve, steam exhaust system and certificate of test. **Without basket.**

For towns (coal) gas	Each	**£857·00** *bxN*
For natural (methane) gas	Each	**£857·00** *bxN*

AX-111

AUTOCLAVE, *Gallenkamp*, as AX-110 but including steam leak.

For towns (coal) gas	Each	**£872·00** *bxN*
For natural (methane) gas	Each	**£872·00** *bxN*

When ordering AX-110 and AX-111 please state voltage and frequency of mains electricity supply (required for ignition device) and whether for coal or methane gas supply.

AX-120

AUTOCLAVE, *Gallenkamp*, **vertical type, steam heated,** as specification, with automatic air vent, pressure gauge, safety valve, steam condensate trap, steam exhaust system and certificate of test. **Requires but does not include mains steam pressure reducing valve and is without basket** ... Each **£811·00** *bxN*

AX-121

AUTOCLAVE, *Gallenkamp*, **to BS 2646,** as AX-120 but including steam leak. **Requires but does not include mains steam pressure reducing valve.**

Each **£826·00** *bxN*

ACCESSORIES AND REPLACEMENT PARTS for AX-100 to AX-121

AX-130	**Lid gasket,** rubber	Each	**£2·25** *bx*
AX-135	**Basket,** 45 cm dia. × 45 cm deep, strongly constructed in wire mesh with carrying handle ...	Each	**£7·00** *bx*
AX-137	**Half basket,** 45 cm dia. × 20 cm deep.	Each	**£5·00** *bx*
AX-140	**Wire separator,** for use when layers of small baskets are inserted in autoclaves. Each separator is about 2·6 cm thick and allows the free circulation of steam.	Each	**£3·75** *bx*
AX-142	**Reducing valve,** adjustable, to insert in steam supply line to control the operating pressure up to a maximum of 2·1 kgf/cm^2. Fitted with 0·5 in BSP female connection. For use with AX-120 and AX-121 only...	Each	**£21·00** *bxN*

When ordering mains steam supply pressure must be stated.

TJ-060	**Thermometer,** 0–150°C, to fit thermometer pocket. For price see entry in List No. sequence.

When ordering replacement parts please state serial number of autoclave and, as appropriate, details of electricity, gas and steam supply.

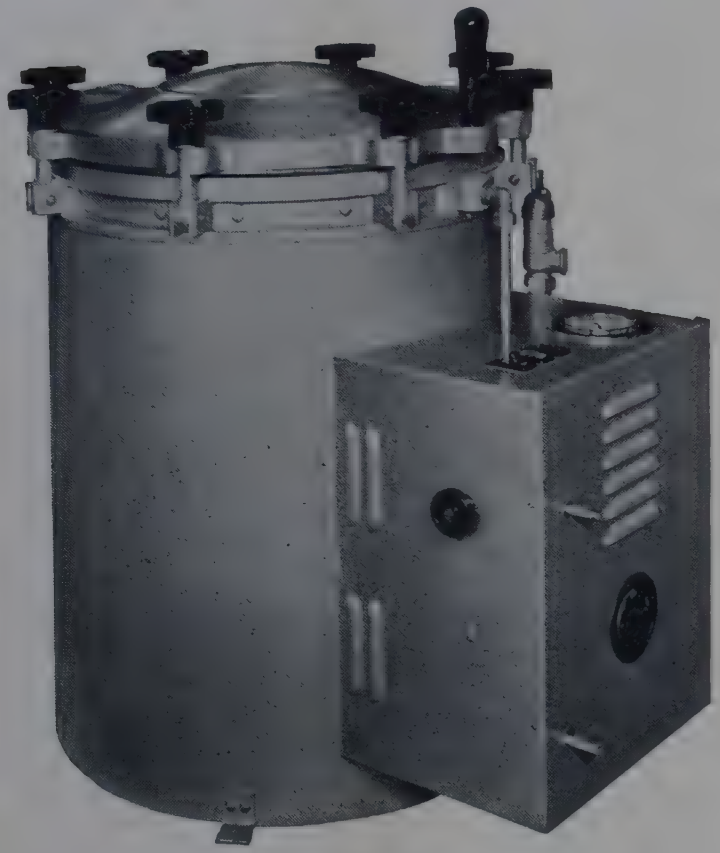
For other Autoclaves see overleaf.

Gallenkamp AUTOCLAVES

REGD. TRADE MARK

FOR ELECTRIC OR GAS HEATING

For the steam sterilisation of surgical instruments, dressings and biochemistry equipment.



AX-250

- **Vertical and horizontal models**
- **Controlled steam temperature by bimetal thermostat on electrically heated models and gas thermostat on gas heated models**
- **Integral pressure gauge and safety valve**
- **Sturdy construction**

PERFORMANCE AND DIMENSIONS

Maximum working pressure 2·1 kgf/cm^2 (30 lbf/in^2)

Size	1	2	
Diameter of boiler	34·5	46	cm
Working depth of boiler	30	38	cm
Overall dimensions with lid open			
Vertical autoclaves	H W D	H W D	
List No. AX-250	74×56×75	80×64×100	cm
List No. AX-252	84×54×75	94×64×100	cm
Horizontal autoclaves			
List No. AX-254	79×64×79	91×74×84	cm
Drain outlet diameter	10	10	mm

All boilers are pressure tested during manufacture. Each autoclave is tested under working conditions before despatch and a certificate is supplied giving essential details of construction and tests.

OPERATION AND DESIGN

Electrically heated models

Heating is by a sheathed immersion heater and temperature is controlled by a bimetal thermostat.

Gas heated models

Temperature is controlled by an adjustable gas thermostat which regulates the supply of gas to the burner.

GENERAL CONSTRUCTION (ALL MODELS)

The boiler is constructed of copper, with an alloy cover and top ring incorporating a recessed gasket. It is mounted in a steel casing which in the vertical model extends to the floor. The horizontal model is supported on a strong tubular metal stand.

The cover of vertical models is hinged and, after releasing the bolts, may be raised clear of the boiler. Each autoclave is supplied with a wire mesh basket. Horizontal autoclaves have doors hinged on one side and a perforated shelf is supplied with each instead of a wire basket.

Steam fittings comprise a stopcock, adjustable safety valve, automatic air vent and pressure gauge, all connected to the body of the boiler. The controls are housed in a control box mounted on the steel casing. The safety valve is an approved type fitted with an easing lever whose setting can be locked with the padlock supplied.

Gallenkamp AUTOCLAVES

AX-250

AUTOCLAVES, *Gallenkamp*, **vertical type, electrically heated,** as specification, with thermostatically controlled immersion heater, pressure gauge, safety valve, and wire mesh basket. Certificate of test issued. For a.c. single phase supplies.

Size No.		1	2	
Power rating, max.		3	5 kW	
For 220/240V	Each	**£472·00**	**654·00**	*bx*
For 200/210V	Each	**£472·00**	**654·00**	*bxN*
For 110/120V	Each	**£482·00**	**664·00**	*bxN*

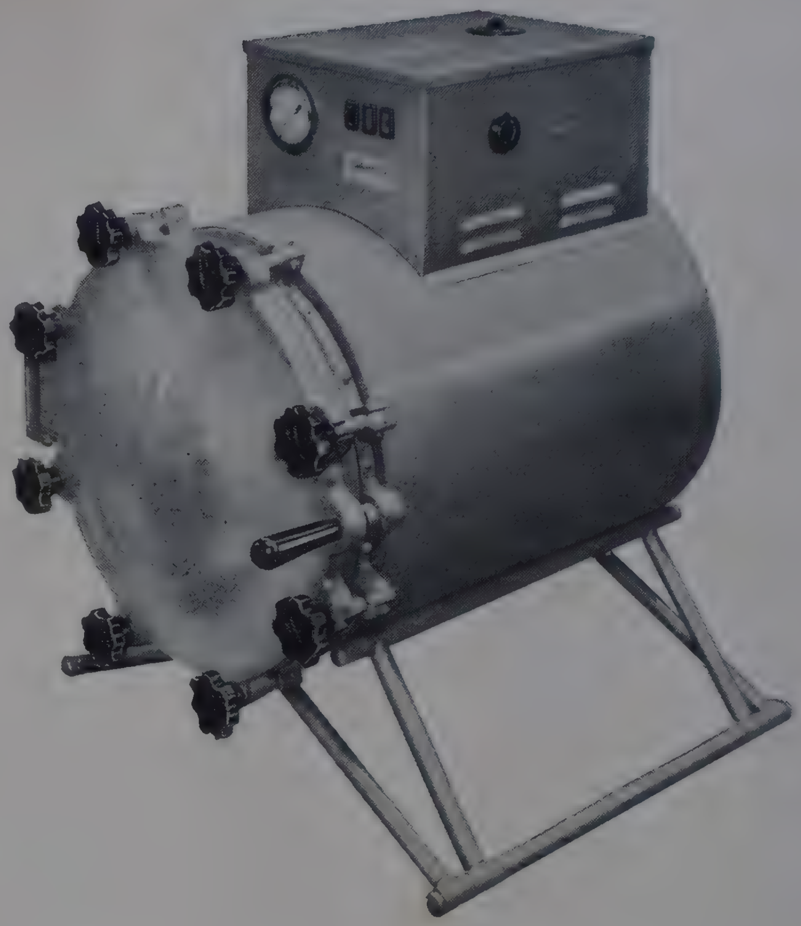
When ordering please state voltage and frequency of supply.

AX-252

AUTOCLAVES, *Gallenkamp*, **vertical type, gas heated,** as specification, with gas burner and adjustable gas thermostat, pressure gauge, safety valve and wire mesh basket. Certificate of test issued.

Size No.		1	2	
For towns (coal) gas	Each	**£412·00**	**585·00**	*bxN*
For natural (methane) gas	Each	**£412·00**	**585·00**	*bxN*

When ordering please state for which gas required.


AX-254

AX-254

AUTOCLAVES, *Gallenkamp*, **horizontal type, electrically heated,** as specification **but** with perforated shelf in place of wire basket. For a.c. single phase supplies. Certificate of test issued.

Size		1	2	
Power rating, max.		3	5 kW	
For 220/240V	Each	**£551·00**	**766·00**	*bxN*
For 200/210V	Each	**£551·00**	**766·00**	*bxN*
For 110/120V	Each	**£561·00**	**776·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

AX-256 **Immersion heaters,** for AX-250 and AX-254.

Size No.	1	2	
Each	**£7·75**	**8·00**	*bx*

AX-258 **Lid gasket,** for all models, Size No. 1... Each **£0·75** *bx*

AX-130 **Lid gasket,** for all models, Size No. 2. For price see entry in List No. sequence.

When ordering replacement parts please state serial number of autoclave and voltage and frequency of supply.

Gallenkamp

HOT AIR STERILISERS

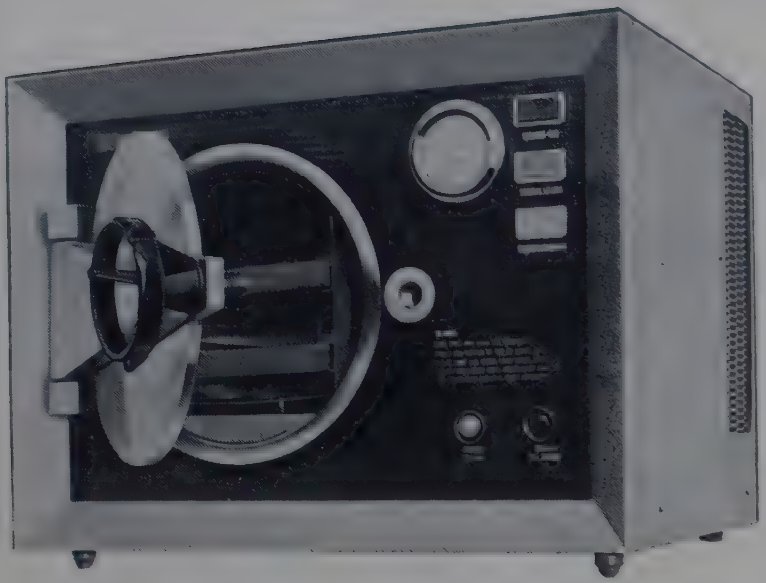
OV-010 **Hotbox Oven Sterilisers, 200°C maximum.** Two sizes available with wide shelves.

OV-160 **BS Oven Sterilisers, 250°C maximum.** Precise temperature control. Choice of three sizes. Operation to BS 2648 and BS 3421.

OV-420 **Oven Steriliser, 250°C maximum.** Accurate temperature control. Capacity 210 litres. Operation to BS 3421.

For full details and prices see entries in List No. sequence.

AUTOMATIC AUTOCLAVE



AX-360

AX-360

AUTOCLAVE, automatic, steam heated by closed circuit steam produced in an integral electrically heated boiler to eliminate the need for an independent steam supply. Sterilisation is at 134°C and the exposure period is timed automatically for a minimum of 3½ minutes starting from when the correct temperature has been reached. Total cycle time, dependent on load, is about 12 minutes. The stainless steel sterilising chamber, 20 cm dia. × 30 cm deep, has positions for four trays 14 × 28 cm. A lock prevents the stainless steel door from being opened under pressure and a safety cut-out protects the chamber contents from overheating. The sterilising and safe discharging periods are shown by separate indicator lamps mounted on the front panel. A mains ON lamp is also fitted. The autoclave has no permanent air bleeds, no escape of steam from the 'circuit' to atmosphere, and no external piping. Overall dimensions: 50 × 36 × 41 cm. Power rating 2 kW. For 220/240V 50 Hz single phase supplies. Complete with two chromium-plated trays 14 × 28 cm.
Each **£190·00** *fxN*

PORTABLE AUTOCLAVES

These autoclaves are tested to twice the normal working pressure before despatch and are approved by insurance companies. Both models are fitted with pressure gauge, drain cock, and adjustable safety valve which can be set at 10 lbf/in^2 (0·7 kgf/cm^2) and 15 lbf/in^2 (1·05 kgf/cm^2). The reduced pressure which develops after sterilisation may be used to produce dry sterile dressings.

AX-382

AX-380

AUTOCLAVE, portable, as specification, **gas heated.** With aluminium boiler, dia. 28 cm, depth 25 cm. **Accepts but does not include one dressing drum AX-435. Requires but does not include a gas burner.**
Each **£51·50** *mx*

AX-382

AUTOCLAVE, portable, as specification, **electrically heated.** With aluminium boiler, dia. 28 cm, depth 25 cm. Fitted with two heaters, maximum power rating 1850W, and a 3-heat switch. **Accepts but does not include one dressing drum AX-435.** For 230/250V a.c. or d.c. supplies ... ... Each **£72·50** *mx*

REPLACEMENT PARTS

AX-420	**Heating elements**	Set of 2	**£7·70** mx
AX-422	**Lid gasket**	Each	**£1·30** mx
AX-426	**Safety valve**	Each	**£3·40** mx

ACCESSORIES

AX-435	**Dressing drum,** stainless steel, 24 × 24 cm.	Each	**£15·00** mx
BX-305	**Ring burner** for use with AX-380. For details and price see entry in List No. sequence.		

BALANCES

SECTION INDEX

Balance type	page	Balance type	page
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Micro analytical	34	Sliding weight	51
Semi-micro analytical	35	Rotating weight	51
Analytical, single pan	36/37 and 48	Triple beam	52
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Analytical, electronic	38	Torsion	53
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Headquarters and Research and Development Laboratories of Mettler at Greifensee-Zurich, Switzerland.

METTLER BALANCES

Gallenkamp are sole distributors for the United Kingdom of Great Britain and Northern Ireland.

The advance of science has always been largely dependent on the development and improvement of measuring techniques. In this context, a major contribution was made when *Mettler* in Switzerland introduced the substitution weighing, single pan analytical balance, employing for the first time the principle of constant beam loading.

In this system the internal weights are suspended on the same end of the beam as the balance pan and are lifted mechanically until the load removed is equal to the weight of the article on the pan so that equilibrium is restored.

Errors due to unequal spacing of knife edges and beam flexing are completely eliminated and the sensitivity of the balance is constant throughout the whole weighing range. *Mettler* are recognised throughout the world as the leading manufacturers of single pan analytical and precision balances and the following pages present the comprehensive range now available.

METTLER BALANCES INCORPORATE THE FOLLOWING FEATURES:

For accurate weighing

- Weights are manufactured from non-magnetic corrosion resistant nickel-chromium steel.
- Each weight is precision calibrated to an apparent mass density of 8·4.
- Substitution weighing system with constant beam loading.
- Materials used for knife edge suspension systems are chosen for hard wear and long life properties to suit the range of the balance.
- Optical scales, cursors, verniers and digital indicators are designed for quick unambiguous reading.
- Level indicators and adjustable feet are standard.

For rapid weighing

- Wide range optical scales eliminate manipulation of small weights or riders; on many models the addition of weights is eliminated altogether.
- The addition or removal of weights, on those models requiring it, is accomplished simply by knob controls.
- Efficient damping eliminates the time wasted waiting for a swinging beam to settle.
- Partial release of the beam on arrested beam models allows rapid observation of the approach of balance and minimises knife edge wear.
- Several models are equipped with a tare facility to speed operation and eliminate errors of arithmetic subtraction.
- Some analytical models available with pre-weigh facility.

THE RANGE OF *METTLER* BALANCES IS DIVIDED INTO TWO BASIC GROUPS:

Analytical balances

A comprehensive range of ultra-micro, micro, general purpose and heavy duty balances of outstanding performance and reliability.

- Corundum bearings, jewelled suspension and patented air damping.
- Single suspended pan.
- Integral annular concentric weights.
- Easily read optical scale.
- Digital reading on some models.
- Draught-proof weighing chamber.
- Print-out, tare, continuous recording, electronic output and below the balance weighing facilities available on many models.

Top loading balances

A comprehensive range of compact balances of outstanding performance and rugged durability for rapid, general purpose weighing.

- Silicon carbide knife edges, corundum or hardened steel planes and magnetic damping.
- Single top loading pan.
- Integral annular weights.
- Easily read optical scale.
- Automatic level compensation.
- Tare facility.
- Below balance weighing facility.

In addition to these two major groups, *Mettler* also manufacture a number of balances for special purposes such as precious stone measurements. Details of *Mettler* balances are given on pages 33 to 45.

METTLER BALANCES

MODEL NO. INDEX

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Infrared dryer	46	Weighing accessories	47
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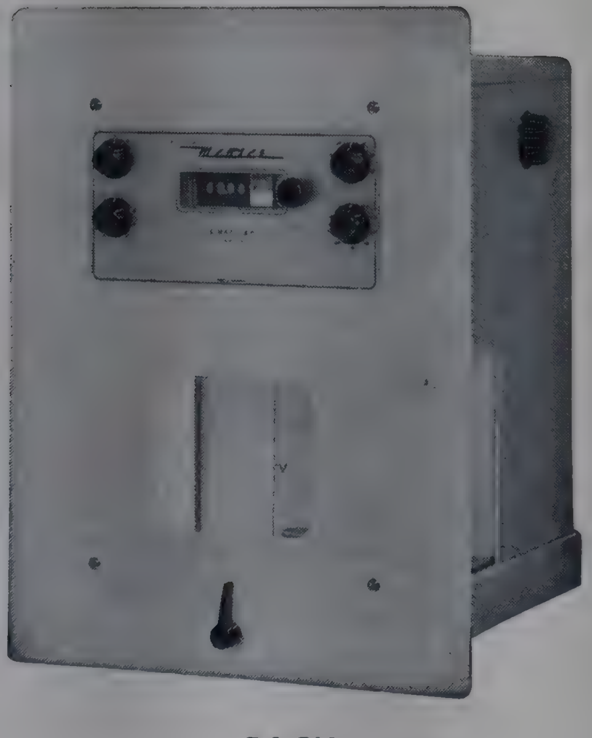
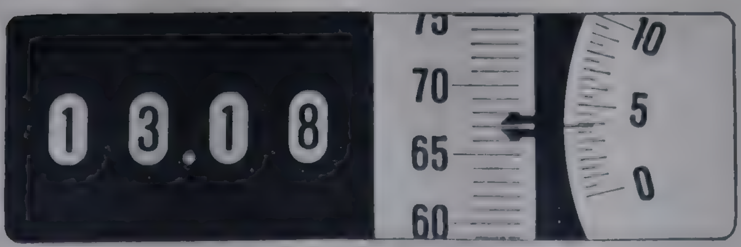
Mettler **Vibro-Spatula**—see entry SJ-402 under page heading **SPATULAS.**

METTLER BALANCES

BA-500



BA-510



Readout display on BA-510 to BA-514

ULTRA-MICRO ANALYTICAL

***BA-500**

BALANCE, ultra-micro analytical, *Mettler* UM7. Weighing range **2 mg.** Readability **0·0001 mg.** Precision ±0·0001 mg. Optical scale range 2 mg. Read by means of a built-in microscope and optical micrometer. Complete with two 100 mg tared platinum weighing boats BA-978 ... ... Each **£726·00** *kxN*

***BA-502**

BALANCE, ultra-micro analytical, *Mettler* UM6. Weighing range **10 mg.** Readability **0·0005 mg.** Precision ±0·0005 mg. Optical scale range 10 mg. Read by means of a built-in microscope directly from digital scale. Complete with two 500 mg tared platinum weighing boats BA-978 ... ... Each **£801·00** *kxN*

MICRO ANALYTICAL

***BA-510**

BALANCE, micro analytical, *Mettler* M5. Weighing range **20 g.** Readability **0·001 mg.** Precision ±0·001 mg. Optical scale range 20 mg. Stainless steel pan diameter 40 mm, height of stirrup 110 mm. In white finished light alloy housing. Each **£554·00** *kx*

***BA-512**

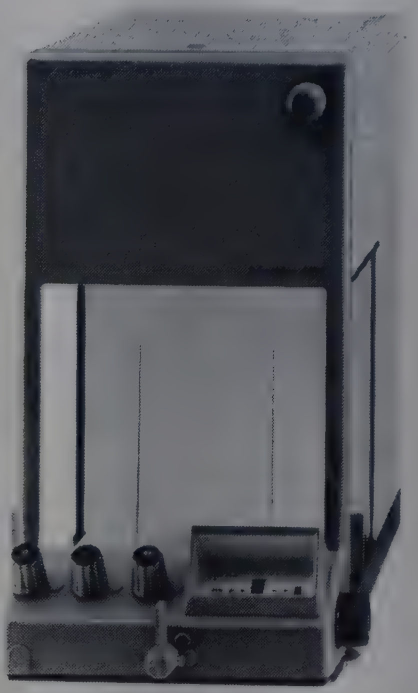
BALANCE, micro analytical, *Mettler* M5 GD. Weighing range **20 g.** Readability **0·001 mg.** As BA-510 but with removable attachment for weighing below the balance... ... ... Each **£581·00** *kx*

***BA-514**

BALANCE, micro analytical, *Mettler* M5 SA. Weighing range **20 g.** Readability **0·001 mg.** As BA-510 but with swing out pan, diameter 30 mm, for simplified loading ... ... Each **£613·00** *kx*

METTLER BALANCES

SEMI-MICRO ANALYTICAL



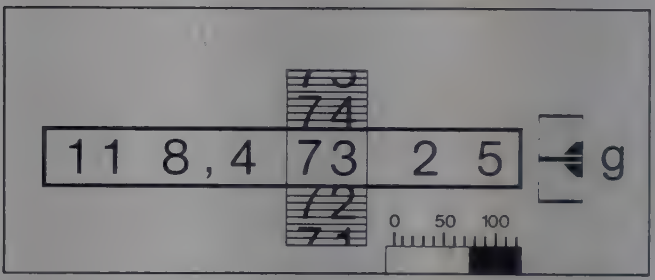
BA-528

*BA-528

BALANCE, semi-micro analytical, *Mettler* H51.
Weighing range **160 g.** Readability **0·01 mg.**
Capacity 160·1 g. Precision ±0·01 mg.
Optical scale range 125 mg. Optical tare 0·1 g. Total weight displayed digitally. Stainless steel pan diameter 90 mm, height of stirrup 180 mm. In two-tone aluminium alloy housing with bench level controls. Each **£299·00** *kx*

*BA-531

BALANCE, semi-micro analytical, *Mettler* H54.
Weighing range **160 g.** Readability **0·01 mg.**
Capacity 160·1 g. Precision ±0·01 mg.
Optical scale range 125 mg. Optical tare 0·1 g. Total weight displayed digitally with separate tare indication up to 159·9 g. Stainless steel pan diameter 90 mm, height of stirrup 180 mm. In two-tone aluminium alloy housing with bench level controls ... ... Each **£336·00** *kx*



Readout display BA-528 to BA-541

*BA-538

BALANCE, semi-micro analytical, *Mettler* H542.
Weighing range **160 g.** Readability **0·01 mg.**
As BA-531 but with stirrup height 260 mm.
Each **£366·00** *kx*

*BA-541

BALANCE, semi-micro analytical, *Mettler* H64.
Weighing range **160 g.** Readability **0·01 mg.**
As BA-531 but with motorised, push-button operated arrest and release of beam ... ... Each **£385·00** *kx*

Mettler

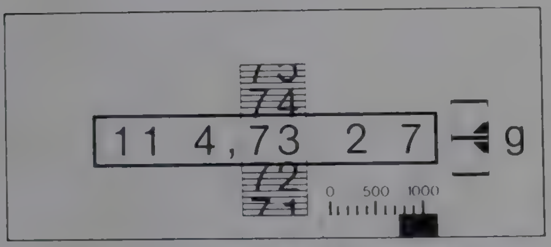
BELOW BALANCE WEIGHING

All Model H balances can be fitted with attachment for below balance weighing. Details on request.

BA-541

METTLER BALANCES

BA-543



Readout display BA-543 to BA-563

BA-562

ANALYTICAL

***BA-543**

BALANCE, analytical, *Mettler* H30.
Weighing range **160 g.** Readability **0·1 mg.**
Capacity 160 g. Precision ±0·05 mg.
Optical scale range 1000 mg. Total weight displayed digitally. Stainless steel pan 90 mm diameter, height of stirrup 180 mm. In two-tone aluminium alloy housing with bench level controls ... ... Each **£220·00** *kx*

***BA-545**

BALANCE, analytical, *Mettler* H31.
Weighing range **160 g.** Readability **0·1 mg.**
As BA-543 but capacity 161 g and optical tare up to 1 g.
Each **£237·00** *kx*

***BA-557**

BALANCE, analytical, *Mettler* H32.
Weighing range **160 g.** Readability **0·1 mg.**
As BA-543 but with automatic pre-weighing range of 160 g.
Each **£248·00** *kx*

***BA-559**

BALANCE, analytical, *Mettler* H33.
Weighing range **160 g.** Readability **0·1 mg.**
As BA-543 but with optical tare up to 1 g and automatic pre-weighing range of 160 g ... ... Each **£256·00** *kx*

Mettler

ILLUMINATED WEIGHING CHAMBER

All Model H balances can be supplied with illuminated weighing chamber. Details on request.

***BA-562**

BALANCE, analytical, *Mettler* H34.
Weighing range **160 g.** Readability **0·1 mg.**
Capacity 170 g. Precision ±0·05 mg.
Optical scale range 1000 mg. Optical tare up to 1 g and separate tare indication up to 159 g. Total weight displayed digitally. Stainless steel pan 90 mm diameter, height of stirrup 180 mm. In two-tone aluminium alloy housing with bench level controls ... Each **£271·00** *kx*

***BA-563**

BALANCE, analytical, *Mettler* H35.
Weighing range **160 g.** Readability **0·1 mg.**
As BA-562 but with automatic pre-weighing range of 160 g.
Each **£295·00** *kx*

METTLER BALANCES

ANALYTICAL

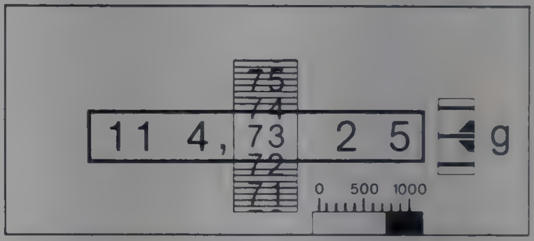
***BA-567**

BALANCE, analytical, *Mettler H43.*
Weighing range **160 g.** Readability **0·1 mg.**
Capacity 170 g. Precision ±0·05 mg.
Optical scale range 1000 mg. Optical tare up to 1 g and automatic pre-weighing range of 160 g. With motorised push button operated arrest and release of beam. Stainless steel pan 90 mm diameter, height of stirrup 180 mm. In two-tone aluminium housing with bench level controls.
Each **£307·00** *kx*

***BA-570**

BALANCE, analytical, *Mettler H45.*
Weighing range **160 g.** Readability **0·1 mg.**
Capacity 170 g. Precision ±0·05 mg.
Optical scale range 1000 mg. Optical tare up to 1 g and separate tare indication up to 159 g. Total weight displayed digitally. With automatic pre-weighing range of 160 g and motorised, push button operated arrest and release of beam. Stainless steel pan 90 mm diameter, height of stirrup 180 mm. In two-tone aluminium alloy housing with bench level controls ... Each **£344·00** *kx*

BA-570



Readout display BA-570 to BA-576

***BA-574**

BALANCE, analytical, *Mettler H311.*
Weighing range **240 g.** Readability **0·1 mg.**
Capacity 241 g. Precision ±0·05 mg.
Optical scale range 1000 mg. Optical tare 1 g. Total weight displayed digitally. Stainless steel pan 90 mm diameter, height of stirrup 260 mm. In two-tone aluminium alloy housing with bench level controls. Each **£337·00** *kx*

***BA-576**

BALANCE, analytical, *Mettler H315.*
Weighing range **1000 g.** Readability **0·1 mg.**
Capacity 1001 g. Precision ±0·1 mg.
Optical scale range 1000 mg. Optical tare 1 g. Total weight displayed digitally. Stainless steel pan 135 mm diameter, height of stirrup 190 mm. In two-tone aluminium alloy housing with bench level controls. Each **£495·00** *kx*

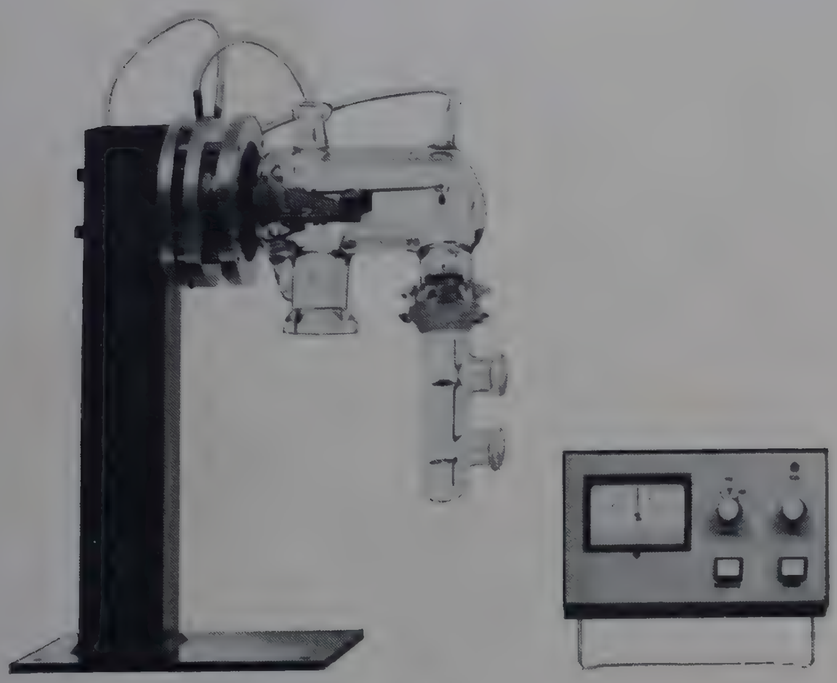
Mettler

EXPLOSION PROOFING

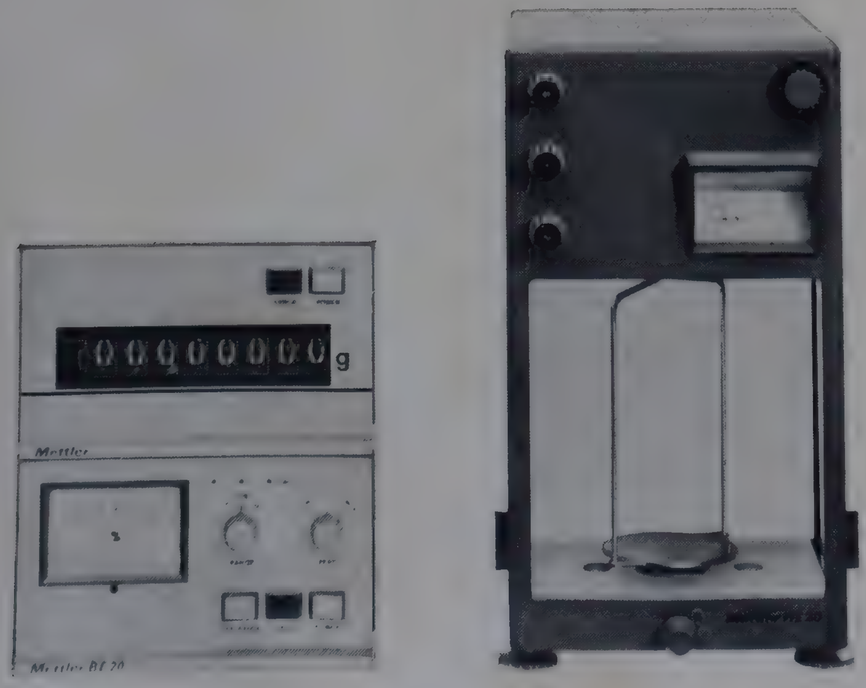
Most Model H balances can be supplied for use in flammable atmospheres. Details on request.

BA-574

METTLER BALANCES



BA-715



BA-760 with BA-768

ANALYTICAL ELECTRONIC

*BA-715

BALANCE, micro analytical electronic, *Mettler* ME21, enclosed model for weighing under vacuum of 10^{-6} torr. Total capacity 3g.

Weighing ranges	±1	±10	±100 mg.
Readability	0·1	1·0	10·0 μg.

Complete with separate control box BE21.

Price from **£1457·00** *kxN*

*BA-721

BALANCE, micro analytical electronic, *Mettler* ME22 bench model. Total capacity 3 g.

Weighing ranges	±1	±10	±100 mg.
Readability	0·1	1·0	10·00 μg.

Complete with separate control box BE22.

Price from **£1183·00** *kxN*

ACCESSORIES for BA-715 and BA-721

***BA-723**	**Electronic 5-digit indicator,** *Mettler* BA15, with 1248 BCD output	Price from **£683·00***kxN*
***BA-724**	**Electronic 5-digit indicator,** *Mettler* BA25, as BA-723 but with automatic tare facility ...	Price from **£801·00***kxN*

*BA-760

BALANCE, semi-micro analytical electronic, *Mettler* HE20.

Weighing ranges	—0·1 to +160 g.	±1 g.
Readability	0·01 mg.	0·1 mg.

With separate control box BE20.

Price from **£823·00** *kxN*

*BA-764

BALANCE, semi-micro analytical electronic, *Mettler* HE20 MV. As BA-760 but with motorised push button release and arrest facility and cycle control unit BC12.

Price from **£1161·00** *kxN*

ACCESSORIES for BA-760 and BA-764

BA-723	**Electronic 5-digit indicator** ...	For details and prices see entries above.
BA-724	**Electronic 5-digit indicator** with tare	
***BA-768**	**Electronic 8-digit indicator,** *Mettler* BA18, with 1248 BCD output	Price from **£825·00***kxN*
***BA-769**	**Electronic 8-digit indicator,** *Mettler* BA28 as BA-768 but with automatic tare facility ...	Price from **£1000·00***kxN*

*BA-770

BALANCE, analytical electronic, *Mettler* HE10.

Weighing ranges	—1 to +160 g.	±10 g.
Readability	0·1 mg.	1·0 mg.

With separate control box BE10.

Price from **£812·00** *kxN*

*BA-774

BALANCE, analytical electronic, *Mettler* HE10 MV. As BA-770 but with motorised push button release and arrest facility and cycle control unit BC12.

Price from **£1161·00** *kxN*

ACCESSORIES for BA-770 and BA-774

BA-723	**Electronic 5-digit indicator**	For details and prices see entries above.
BA-724	**Electronic 5-digit indicator** with tare.	
BA-768	**Electronic 8-digit indicator**	
BA-769	**Electronic 8-digit indicator** with tare.	

METTLER BALANCES

TOP LOADING

***BA-808**

BALANCE, precision, *Mettler* P161,
Weighing range **160 g.** Readability **1·0 mg.**
Capacity 160 g. Precision ±1·0 mg.
Optical scale range 10 g, total weight displayed digitally.
In two-tone housing ... ... Each **£203·00** *kx*

BA-808

***BA-810**

BALANCE, precision, *Mettler* P160.
Weighing range **160 g.** Readability **1·0 mg.**
Capacity 170 g. Precision ±1·0 mg.
Optical scale range 10 g, total weight displayed digitally.
Optical tare 10 g. Incorporates complementary scale by which decreases in weight (e.g. as the result of drying) may be read digitally. In two-tone housing. Each **£282·00** *kx*

***BA-812**

BALANCE, precision, *Mettler* P160 N.
Weighing range **160 g.** Readability **1·0 mg.**
As BA-810 but with automatic compensation for errors caused by changes in balance level ... Each **£310·00** *kx*

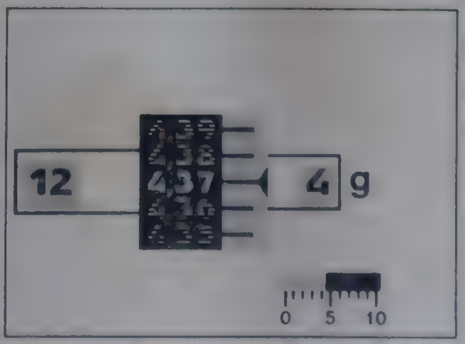
BA-816

***BA-814**

BALANCE, precision, *Mettler* P162.
Weighing range **160 g.** Readability **1·0 mg.**
Capacity 170 g. Precision ±1·0 mg.
Optical scale range 10 g total weight displayed digitally.
Optical tare 10 g. In two-tone housing. Each **£275·00** *kx*

***BA-816**

BALANCE, precision, *Mettler* P162 N.
Weighing range **160 g.** Readability **1·0 mg.**
As BA-814 but with automatic compensation for errors caused by changes in balance level ... Each **£303·00** *kx*



Readout display BA-808 to BA-816

ACCESSORY for BA-808 to BA-816

BA-948 **Infrared dryer,** *Mettler* LP12. For details and price see entry in List No. sequence.

ACCESSORIES for top loading balances see pages 46 and 47.

METTLER BALANCES

TOP LOADING

BA-818

***BA-818**

BALANCE, precision, *Mettler* P163.

Weighing range **160 g.** Readability **1·0 mg.**

Capacity 170 g. Precision ±1·0 mg.

Optical scale range 10 g, total weight displayed digitally. Optical tare 10 g. In two-tone housing. Each **£262·00** *kx*

***BA-819**

BALANCE, precision, *Mettler* P163 N.

Weighing range **160 g.** Readability **1·0 mg.**

As BA-818 but with automatic compensation for errors caused by changes in balance level ... Each **£290·00** *kx*

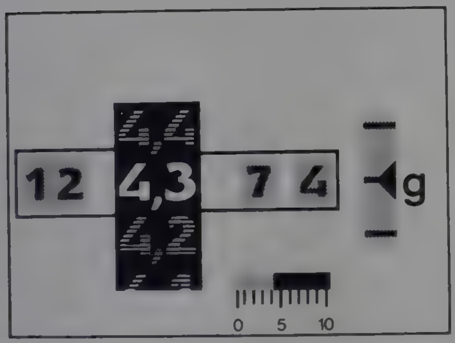
***BA-825**

BALANCE, precision, *Mettler* P323.

Weighing range **320 g.** Readability **1·0 mg.**

Capacity 330 g. Precision ±2·0 mg.

Optical scale range 10 g, total weight within weighing range displayed digitally. Optical tare 10 g. In two-tone metal housing ... ... Each **£310·00** *kx*



Readout display BA-818 to BA-827

***BA-827**

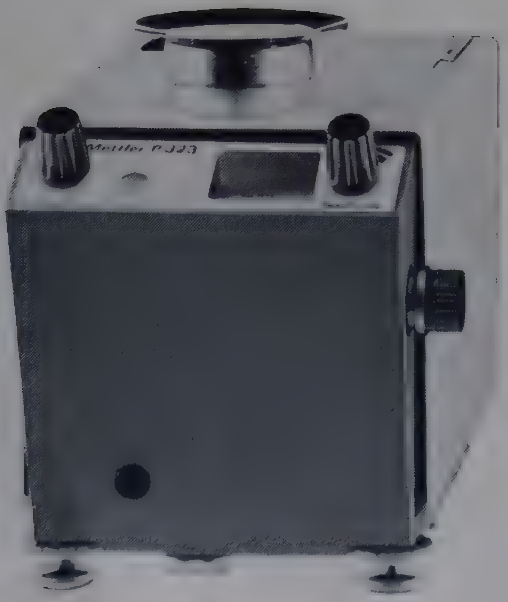
BALANCE, precision, *Mettler* P323 N.

Weighing range **320 g.** Readability **1·0 mg.**

As BA-825 but with automatic compensation for errors caused by changes in balance level ... Each **£338·00** *kx*

ACCESSORY for BA-818 to BA-827

BA-948 **Infrared dryer,** *Mettler* LP12. For details see entries in List No. sequence.



BA-825

***BA-834**

BALANCE, precision, *Mettler* P203.

Weighing range **200 g.** Readability **10 mg.**

Capacity 300 g. Precision ±5 mg.

Optical scale range 200 g, total weight within weighing range displayed digitally. Optical tare 100 g. In two-tone metal housing ... ... Each **£220·00** *kx*

***BA-835**

BALANCE, precision, *Mettler* P203 N.

Weighing range **200 g.** Readability **10 mg.**

As BA-834 but with automatic compensation for errors caused by changes in balance level ... Each **£248·00** *kx*

ACCESSORIES for top loading balances see pages 46 and 47.

METTLER BALANCES

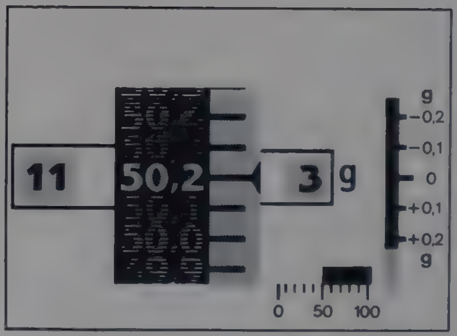
TOP LOADING

***BA-844**
BALANCE, precision, *Mettler* P1200.
Weighing range **1200 g.** Readability **10 mg.**
Capacity 1300 g. Precision ±5 mg.
Optical scale range 100 g, total weight within weighing range displayed digitally. Optical tare 100 g. In two-tone metal housing ... ... Each **£286·00** *kx*

BA-844
BA-847

***BA-845**
BALANCE, precision, *Mettler* P1200 N.
Weighing range **1200 g.** Readability **10 mg.**
As BA-844 but with automatic compensation for errors caused by changes in balance level ... Each **£314·00** *kx*

***BA-847**
BALANCE, precision, *Mettler* P1210.
Weighing range **1200 g.** Readability **10 mg.**
Capacity 1300 g. Precision ±5 mg.
Optical scale range 100 g, total weight within weighing range displayed digitally. Optical tare 100 g. In two-tone metal housing ... ... Each **£248·00** *kx*

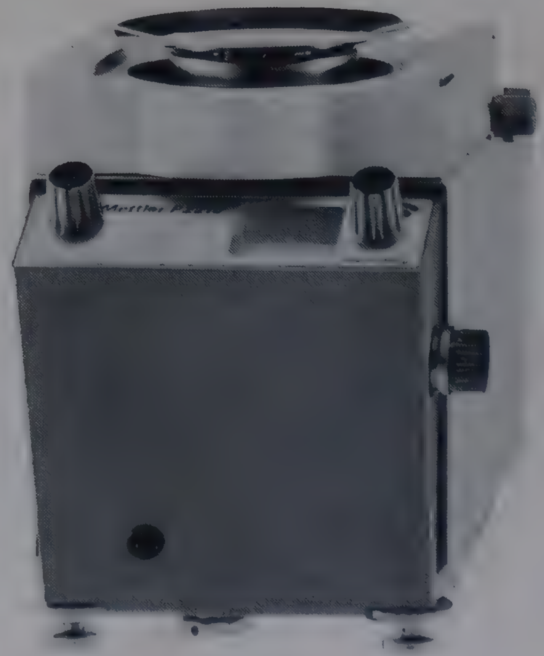


Readout display BA-844 to BA-847

***BA-848**
BALANCE, precision, *Mettler* P1210 N.
Weighing range **1200 g.** Readability **10 mg.**
As BA-847 but with automatic compensation for errors caused by changes in balance level ... Each **£276·00** *kx*

***BA-851**
BALANCE, precision, *Mettler* P2210.
Weighing range **2200 g.** Readability **10 mg.**
Capacity 2300 g. Precision ±10 mg.
Optical scale range 100 g, total weight within weighing range displayed digitally. Optical tare 100 g. In two-tone metal housing ... ... Each **£324·00** *kx*

***BA-852**
BALANCE, precision, *Mettler* P2210 N.
Weighing range **2200 g.** Readability **10 mg.**
As BA-851 but with automatic compensation for errors caused by changes in balance level ... Each **£352·00** *kx*



BA-851

ACCESSORIES for top loading balances see pages 46 and 47.

METTLER BALANCES

Mettler E1000

BA-854

TOP LOADING

***BA-854**

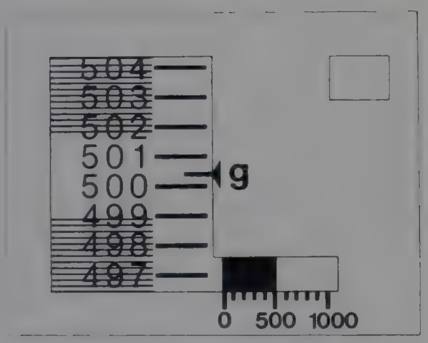
BALANCE, precision, *Mettler* E1000.
Weighing range **1000 g.** Readability **±0·1 g.**
Capacity 1500 g. Precision ±0·1 g.
Optical scale range 1000 g, total weight within weighing range displayed digitally. Optical tare 500 g. In two-tone metal housing ... ... Each **£147·00** *kx*

***BA-858**

BALANCE, precision, *Mettler* P1000.
Weighing range **1000 g.** Readability **0·1 g.**
Capacity 1300 g. Precision ±0·05 g.
Optical scale range 1000 g, total weight within weighing range displayed digitally. Optical tare 300 g. In two-tone metal housing ... ... Each **£243·00** *kx*

***BA-859**

BALANCE, precision, *Mettler* P1000 N.
Weighing range **1000 g.** Readability **0·1 g.**
As BA-858 but with automatic compensation for errors caused by changes in balance level ... Each **£271·00** *kx*



Readout display BA-854

***BA-861**

BALANCE, precision, *Mettler* P2000.
Weighing range **2000 g.** Readability **0·1 g.**
Capacity 2500 g. Precision ±0·05 g.
Optical scale range 1000 g, total weight within weighing range displayed digitally. Optical tare 500 g. In two-tone metal housing ... ... Each **£274·00** *kx*

***BA-862**

BALANCE, precision, *Mettler* P2000 N.
Weighing range **2000 g.** Readability **0·1 g.**
As BA-861 but with automatic compensation for errors caused by changes in balance level ... Each **£302·00** *kx*

ACCESSORIES for top loading balances see pages 46 and 47.

BA-861

METTLER BALANCES MAINTENANCE SCHEME FOR USERS IN THE UNITED KINGDOM

To ensure the continued high performance of your *Mettler* balance, we recommend that you have your balance registered under this scheme so that it may receive regular attention by skilled technicians. Only *Gallenkamp* offer this service by *Mettler* trained engineers.

METTLER BALANCES

TOP LOADING

***BA-864**

BALANCE, precision, *Mettler* P2010.
Weighing range **2000 g.** Readability **0·1 g.**
Capacity 2500 g. Precision, ±0·05 g.
Optical scale range 2000 g, total weight within weighing range displayed digitally. Optical tare 500 g. In two-tone metal housing ... ... Each **£227·00** *kx*

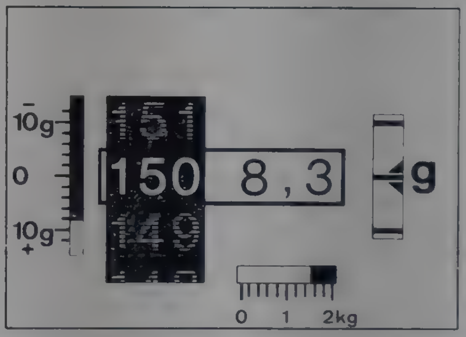
BA-864

***BA-865**

BALANCE, precision, *Mettler* P2010 N.
Weighing range **2000 g.** Readability **0·1 g.**
As BA-864 but with automatic compensation for errors caused by changes in balance level ... Each **£255·00** *kx*

***BA-868**

BALANCE, precision, *Mettler* P5 N.
Weighing range **5000 g.** Readability **0·1 g.**
Capacity 6000 g. Precision ±0·05 g.
Optical scale range 500 g, total weight within weighing range displayed digitally. Optical tare 1000 g. With automatic compensation for errors caused by changes in balance level. In two-tone metal housing. Each **£421·00** *kx*



Readout display BA-864 and BA-865

***BA-869**

BALANCE, precision, *Mettler* P11 N.
Weighing range **10,000 g.** Readability **0·1 g.**
Capacity 11,000 g. Precision ±0·05 g.
Optical scale range 500 g, total weight within weighing range displayed digitally. Optical tare 1000 g. With automatic compensation for errors caused by changes in balance level. In two-tone metal housing. Each **£460·00** *kx*

***BA-871**

BALANCE, precision, *Mettler* P3.
Weighing range **3000 g.** Readability **0·2 g.**
Capacity 5000 g. Precision ±0·05 g.
Optical scale range 3005 g, total weight within weighing range displayed digitally. Optical tare 2000 g. In two-tone metal housing ... ... Each **£305·00** *kx*

BA-868
BA-869

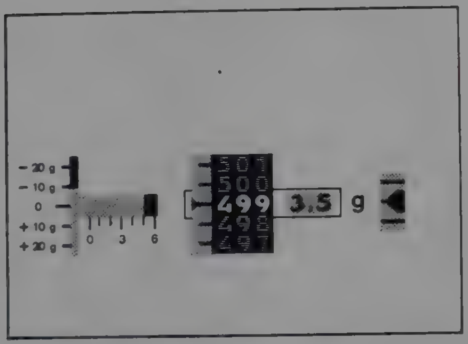
***BA-872**

BALANCE, precision, *Mettler* P3 N.
Weighing range **3000 g.** Readability **0·2 g.**
As BA-871 but with automatic compensation for errors caused by changes in balance level ... Each **£333·00** *kx*

ACCESSORIES for top loading balances see pages 46 and 47.

METTLER BALANCES

BA-874, BA-875
BA-889, BA-890



Readout display BA-874 and BA-875

TOP LOADING

*BA-874

BALANCE, precision, *Mettler* P6.
Weighing range **6000 g.** Readability **0·5 g.**
Capacity 7500 g. Precision ±0·25 g.
Optical scale range 6000 g, total weight within weighing range displayed digitally. Optical tare 1500 g. In two-tone metal housing ... ... Each **£344·00** *kx*

*BA-875

BALANCE, precision, *Mettler* P6 N.
Weighing range **6000 g.** Readability **0·5 g.**
As BA-874 but with automatic compensation for errors caused by changes in balance level ... Each **£372·00** *kx*

*BA-889

BALANCE, precision, *Mettler* P10.
Weighing range **10,000 g.** Readability **1 g.**
Capacity 13,000 g. Precision ±0·5 g.
Optical scale range 10,000 g, total weight within weighing range displayed digitally. Optical tare 3000 g. In two-tone metal housing ... ... Each **£339·00** *kx*

*BA-890

BALANCE, precision, *Mettler* P10 N.
Weighing range **10,000 g.** Readability **1 g.**
As BA-889 but with automatic compensation for errors caused by changes in balance level ... Each **£367·00** *kx*

SPECIAL FACILITIES AVAILABLE FOR *METTLER* TOP LOADING BALANCES

EXPLOSION PROOFING	—	All top loading Model P balances can be supplied modified for use in flammable atmospheres.
DEPT. OF TRADE AND INDUSTRY APPROVAL	—	Most top loading Model P balances can be obtained with Dept. of Trade and Industry type Approval.
CHECK WEIGHING and WEIGHING-IN	—	The following top loading Model P balances can be supplied with check weighing and weighing-in facility: P162, P163, P1000, P1200, P1210, P2000, P5 N, P6 and P11 N.

Details of the above facilities will be supplied on request.

METTLER BALANCES

TOP LOADING ELECTRONIC

***BA-897**

BALANCE, precision electronic, *Mettler* PE162.

Weighing ranges	—10 to +160 g.	±100 g.
Readability	1 mg.	10 mg.

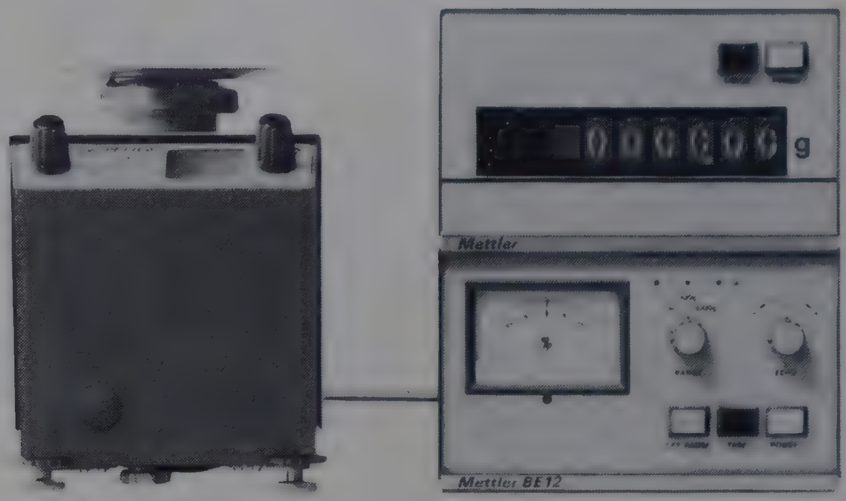
With separate control unit BE11.

Price from **£742·00** *kxN*

ACCESSORIES

BA-899** **Electronic 6-digit indicator,** *Mettler* BA16, with 1248 BCD output ... ... Price from **£748·00kxN*

BA-901** **Electronic 6-digit indicator,** *Mettler* BA26, as BA-899 but with automatic tare facility ... Price from **£866·00kxN*



BA-905 with BA-899

***BA-905**

BALANCE, precision electronic, *Mettler* PE1200.

Weighing ranges	—100 to +1200 g.	±1000 g.
Readability	10 mg.	100 mg.

With separate control unit BE12.

Price from **£769·00** *kxN*

ACCESSORIES

BA-899	**Electronic 6-digit indicator** ...	For details and prices see entries above.
BA-901	**Electronic 6-digit indicator** with tare	

***BA-906**

BALANCE, precision electronic, *Mettler* PE1000.

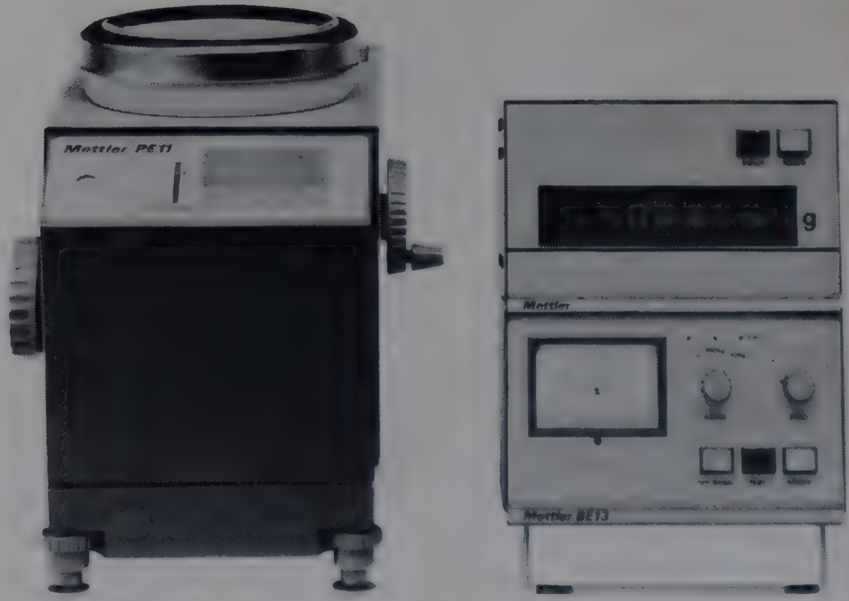
Weighing ranges	±100 g.	—300 to +1000 g.
Readability	10 mg.	100 mg.

With separate control unit BE12.

Price from **£766·00** *kxN*

ACCESSORIES

BA-723	**Electronic 5-digit indicator.**	For details and prices see entries in List No. sequence.
BA-724	**Electronic 6-digit indicator** with tare	



BA-913 with BA-899

***BA-913**

BALANCE, precision electronic, *Mettler* PE11.

Weighing ranges	—1000 +10,000 g.	±100 g.
Readability	100 mg.	10 mg.

With separate control unit BE13.

Price from **£1032·00** *kxN*

ACCESSORIES

BA-899	**Electronic 6-digit indicator** ...	For details and prices see entries above.
BA-901	**Electronic 6-digit indicator** with tare	

REPLACEMENT PARTS FOR METTLER BALANCES

LAMP BULBS

List No.	For balance type	Voltage	Each	
			£	
*BA-930	B, M, K	6·5	1·22	*kx*
*BA-932	H3, H4, H5, H6, H15, H16	3	0·86	*kx*
*BA-935	**All P balances and H balances except those listed under BA-932**	6	1·48	*kx*

METTLER BALANCES

MAINTENANCE SCHEME FOR USERS IN THE UNITED KINGDOM

To ensure the continued high performance of your *Mettler* balance, we recommend that you have your balance registered under this scheme so that it may receive regular attention by skilled technicians. Only *Gallenkamp* offer this service by *Mettler* trained engineers.

ACCESSORIES FOR METTLER BALANCES

BA-948

*BA-948

INFRARED DRYER, *Mettler* LP12, for use with P160, P161, P162, P163 and P323 precision top loading balances. Includes 50 disposable aluminium foil dishes. Overall dimensions 250×280×335 mm, weight 4·5 kg. For 200/240V 50 Hz single phase supplies, power rating max. 170W... ... ... Each **£150·00** *kx*

REPLACEMENT PART

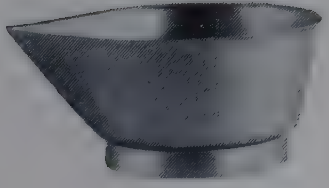
***BA-949 Dishes,** aluminium foil, in pack of 50 ... Pack **£2·58** *kx*

Conversion accessory available for using BA-948 with P203, P1000, P1200, P1210, P2000 and P2010 balances. Details on request.

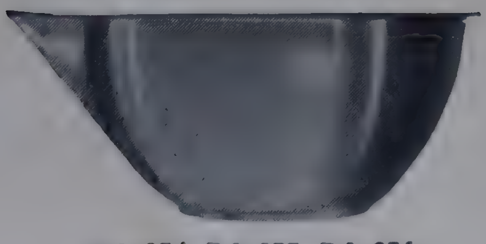
BALANCE PANS

Interchangeable pans for use with the *Mettler* P series precision balances. Pans for each particular balance have identical weights and can be freely interchanged with each other and with the pan supplied with the balance.

List No.	For balance List No.	Material	Capacity ml	Diameter mm	Height mm	Each	
						£	
***BA-950**	BA-808 to BA-819	Stainless steel	180	92	40	**4·65**	*kx*
***BA-952**	BA-820 to BA-842	Poly-propylene	1750	160	140	**4·90**	*kx*
***BA-954**	BA-820 to BA-890	Stainless steel	1000	180	70	**12·40**	*kx*
***BA-955**	BA-850 to BA-890	Stainless steel	2000	230	87	**17·55**	*kx*
***BA-956**	BA-860 to BA-890	Stainless steel	5000	285	145	**21·42**	*kx*


BA-950

BA-952


BA-954, BA-955, BA-956

ACCESSORIES FOR METTLER BALANCES

LIGHT SHIELD

*BA-970

MAGNIFIER/LIGHT SHIELD, for use with all Model B balances. Comprises a light shield and a lens to magnify the optical scale, with bracket to fit into slot in balance case ... ... Each **£3·23** *kx*

BA-970

WEIGHING ACCESSORIES

*BA-974

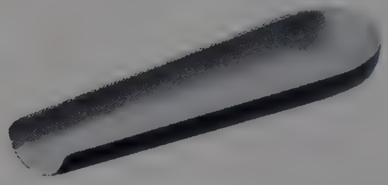
WATCH GLASSES, tared to a predetermined weight with a tolerance of ±1 mg.

Weight	10	20 g	
Diameter	50	70 mm	
Each	**£1·81**	**2·10**	*kx*

*BA-976

WEIGHING SCOOPS, nickel, tared, as BA-974.

Weight	10	20 g	
Length	75	105 mm	
Width	25	35 mm	
Each	**£4·65**	**4·90**	*kx*



BA-976

*SJ-402

VIBRO-SPATULA, *Mettler.* For price and details see entry in List No. sequence.

*BA-978

WEIGHING BOATS, platinum, for use with ultra-micro balances.

For balance	UM7	UM6	
Weight	100	500 mg	
Each	**£5·43**	**33·03**	*kx*

WATCH GLASSES	see WE-025 et seq.
WEIGHING ACCESSORIES	see WT-015 et seq.

For details and prices see entries in List No. sequence.

WORKING COVERS

*BA-980

WORKING COVER, plastics, for use with P160, P161, P162, P163, P203, P323, P1000, P1200, P1210, P2000 and P2010 top loading precision balances. This cover is fitted with a transparent window and a hole through which the pan projects. It is intended to protect the balance when in use in dusty locations ... ... Each **£1·86** *kx*

*BA-981

WORKING COVER, plastics, as BA-980 but for use with P2210 top loading precision balance. Each **£0·97** *kx*

*BA-984

WORKING COVER, plastics, as BA-980 but for use with P3, P5, P6, P10 and P11 top loading precision balances. Each **£3·87** *kx*

*BA-985

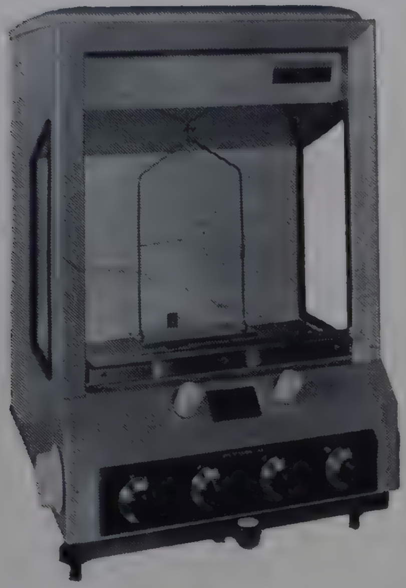
WORKING COVER, plastics, as BA-980 but for use with F1000 top loading precision balance. Each **£2·58** *kx*

DUST COVER

*BA-988

DUST COVER, plastics, for use with H7, H8, H10, H10T, H10TW, H10W, H20, H20E and H20T analytical balances ... ... Each **£1·48** *kx*

ANALYTICAL BALANCES



BB-620
BB-625

BB-640
BB-645

BB-620

BALANCE, analytical single pan, *Oertling* R10. Capacity **200 g.** Sensitivity **1·0 mg.** Optical scale range 1150 mg. Pre-weighing range 2 to 200 g. Taring range 100 g. Rectangular stainless steel pan 120×60 mm, height of stirrup 160 mm. 6V, 18W illumination supply from transformer suitable for 110/250V a.c. supplies. In aluminium alloy case with slide-up front.
Each **£218·00** *fxN*

BB-625

BALANCE, analytical single pan, *Oertling* R20. Capacity **200 g.** Sensitivity **0·1 mg.** Optical scale range 115 mg. Pre-weighing range 1 to 200 g. Taring range 100 g. Rectangular stainless steel pan 120×60 mm, height of stirrup 160 mm. 6V, 18W illumination supply from transformer suitable for 110/250V a.c. supplies. In aluminium alloy case with slide-up front.
Each **£240·00** *fxN*

BB-640

BALANCE, analytical single pan, *Stanton* CL4D. Capacity **200 g.** Sensitivity **0·1 mg.** Optical scale range 1 g. Digital reading to 200 g without external weights. Rectangular stainless steel pan 100×75 mm, height of stirrup 175 mm. 6V, 18W illumination supply from tapped transformer suitable for 200/250V a.c. supplies. In aluminium alloy case with slide-up front.
Each **£239·00** *fxN*
110V model available to special order.

BB-645

BALANCE analytical single pan, *Stanton* CL5D. Capacity **100 g.** Sensitivity **0·01 mg.** Optical scale range 100 mg. Digital reading to 100 g without external weights. Rectangular stainless steel pan 100×75 mm, height of stirrup 175 mm. 6V, 18W illumination supply from tapered transformer suitable for 200/250V a.c. supplies. In aluminium alloy case with slide-up front ... ... Each **£288·00** *fxN*
110V model available to special order.

Gallenkamp MANUFACTURE:

Technico	**Volumetric Glassware** including: burettes, cylinders, density bottles, flasks, pipettes and viscometers.
AG	**Benchblown Glassware** including: condensers, fractionating columns, Soxhlet extractors and stopcocks.
SintAGlass	**Sintered Glassware** including: crucibles, filters, funnels, gas distributors and plates.

For suitable **Balance Weights, Forceps,** etc. see pages 56 and 57.

Gallenkamp STUDENT BALANCES

- Agate bearings
- Stainless steel pans
- Brass beams
- Hardwood baseboards and cases

BC-030

BC-030

BALANCE, student, *Gallenkamp.*
Capacity **250 g.** Sensitivity **2 mg.**
With long pointer and engraved scale, screwed feet and plumb line for levelling, brass beam with agate bearings, adjustments for balance, sensitivity and arrested beam position, front mounted beam arrestment knob and stainless steel pans diameter 100 mm, height of stirrup 200 mm ... ... Each **£20·00** *bx*

ACCESSORY
BC-038 **Balance case,** hardwood, fully glazed with slide-up front window. Internal dimensions, height 370 mm, width 395 mm, depth 208 mm ... ... Each **£7·70** *cx*

BC-040

BC-040

BALANCE, student, *Gallenkamp.*
Capacity **250 g.** Sensitivity **2 mg.**
As BC-030 but with draught excluding glazed case with slide-up front window and right-hand side manipulator for the beam rider. Complete with 10 mg rider. Each **£36·00** *bx*

BC-045

BALANCE, student, *Gallenkamp.*
Capacity **250 g.** Sensitivity **2 mg.**
As BC-040 but with right-hand side control for Grainger chain drum. The chain drum is scaled from 0 to 1 g in 0·01 g subdivisions and enables weight in this range to be added by the progressive addition of the weight of a precision chain ... ... Each **£41·50** *bx*

Gallenkamp
REGD. TRADE MARK

BALANCE WEIGHTS

Arranged on 1-2-2-5 system

ANALYTICAL quality with main weights in stainless steel. Supplied in fitted boxes.

GENERAL PURPOSE quality with main weights in brass. Supplied in fitted boxes or loose.

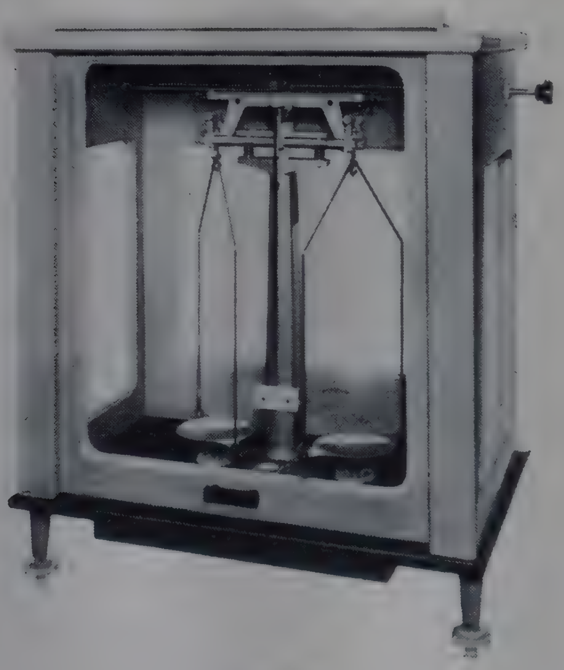
For details and prices see BD-608/609 and BD-650 et seq. in List No. sequence.

BC-045 beam and Grainger drum assembly

STUDENT AND PRECISION BALANCES

BC-070

BC-076


BC-085

BC-088

BC-070
BALANCE, student, two pan.
Capacity **200 g.** Sensitivity **10 mg.**
Weighs to 1 g without external weights. Stainless steel pan diameter 100 mm, height of stirrup 125 mm. Totally enclosed beam with magnetic damping. Includes set of brass weights, 1 g to 100 g with forceps, in drawer below balance pans ... ... Each **£34·00** *fx*

BC-076
BALANCE, student, two pan, *Oertling* J10.
Capacity **250 g.** Sensitivity **5 mg.**
Weighs to 1 g without external weights. Stainless steel pan diameter 100 mm, height of stirrup 125 mm. Totally enclosed beam with magnetic damping. Includes set of brass weights, 1 g to 100 g with forceps, in drawer below balance pans ... ... Each **£39·00** *fx*

BC-080
BALANCE, student analytical, two pan, *Stanton* C26.
Capacity **200 g.** Sensitivity **0·1 mg.**
Stainless steel pan diameter 100 mm, height of stirrup 220 mm. With brass beam having 100 graduations for the 5 mg rider supplied. In plywood case with hinged side doors and slide-up front. ... ... Each **£110·00** *fx*

BC-085
BALANCE, student analytical, two pan, *Oertling* A10.
Capacity **200 g.** Sensitivity **0·2 mg.**
Stainless steel pan diameter 100 mm, height of stirrup 225 mm. With brass beam having 100 graduations for the 5 mg rider supplied. In plywood case with slide-up front.
Each **£110·00** *fx*

BC-088
BALANCE, semi-automatic precision, *Oertling* 71.
Capacity **2 kg.** Sensitivity **0·1 g.**
Rectangular stainless steel weighing pan 200×180 mm, weighing height 22 cm. With 12 cm scale calibrated 0 to 10 g in 0·1 g divisions. Mounted on vitreous enamelled cast iron base ... ... Each **£100·00** *fxN*

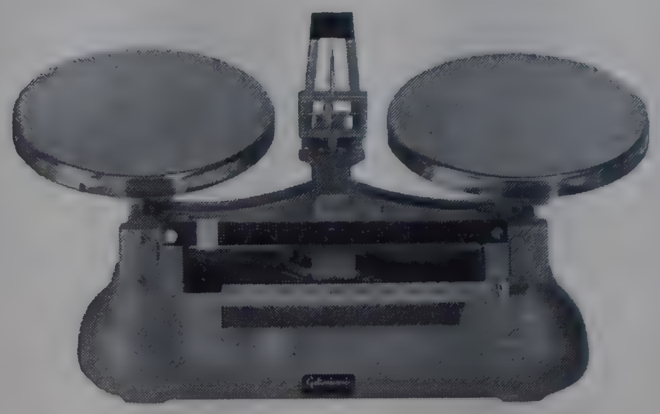
For suitable **Balance Weights, Forceps,** etc. see pages 56 and 57.

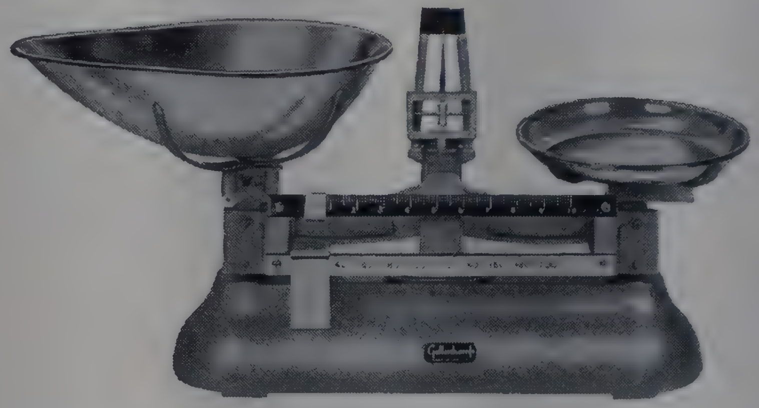
Gallenkamp SLIDING WEIGHT BALANCES

Strongly constructed beam balances, capacity 2 kg, sensitivity 0·1 g, fitted with two scales and the appropriate rider weights. One scale reads 0 to 10 g in 0·1 g and the other 0 to 200 g in 10 g. Weights are unnecessary for weighing up to 210 g.

List No.	Left-hand pan	Weight pan	Each	
			£	
BC-110	Stainless steel circular	Stainless steel circular	24·00	bx
BC-111	Chromium plated scoop	Chromium plated circular	27·50	bx
BC-112	Stainless steel scoop	Stainless steel circular	39·00	bx

BC-115 **Set of weights,** for above balances, for weighing up to 2 kg, consisting of 100, 200, 500, and 1000 g weights in wood block ... ... Set £9·40 cx


BC-110


BC-111
BC-112

Gallenkamp ROTATING WEIGHT BALANCES

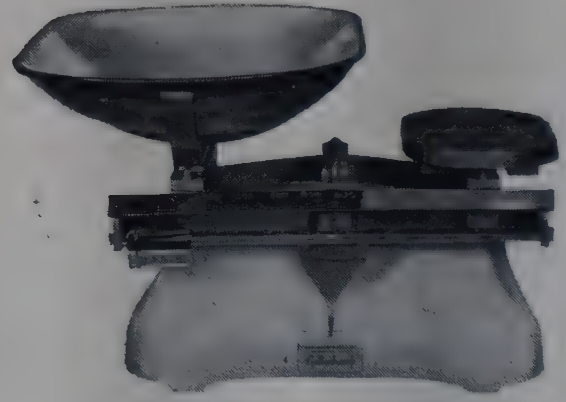
Strongly constructed beam balances, capacity 6 kg, sensitivity 0·5 g. Fitted with one scale 0 to 1000 g in 10 g and a rotating weight covering 0 to 10 g in 0·5 g divisions. Weights are unnecessary for weighing up to 1 kg. The rod carrying the rotating weight is threaded on the top only, allowing the weight to be moved rapidly along the scale by lifting slightly. With flat stove enamelled weight pan.

List No.	Left-hand pan		Each	
	Type	Dimensions		
			£	
BC-160	White porcelain flat	25 × 19 cm	34·00	bx
BC-161	White enamelled iron scoop	38 × 25 × 6 cm	35·00	bx
BC-163	Flat iron with animal cage	25 × 20 × 15 cm	42·00	bx

BC-165 **Set of weights,** for above balances, for weighing up to 6 kg, comprising one 1 kg and two 2 kg iron weights. Set £2·70 cx

NOTE: As sliding weight and rotating weight balances have a zero adjustment weight they do not comply with the Weights and Measures regulations and are not suitable for weighing for sale purposes in the United Kingdom.

BALANCES,
Sedimentation see PARTICLE SIZE
Surface tension see SURFACE TENSION


BC-161

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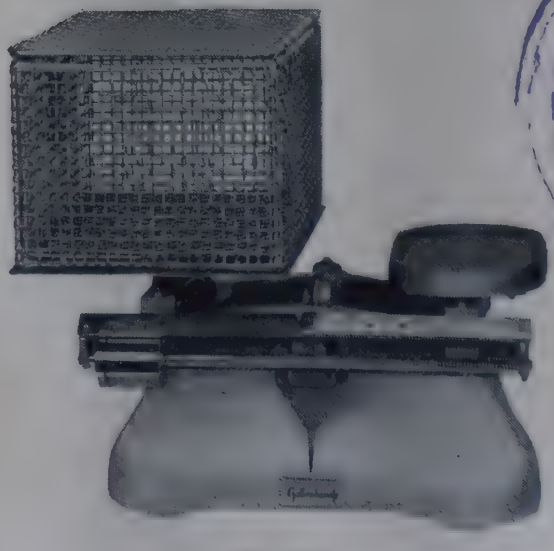
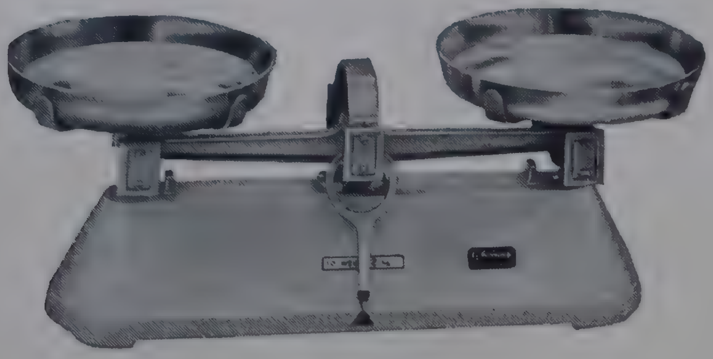

BC-163

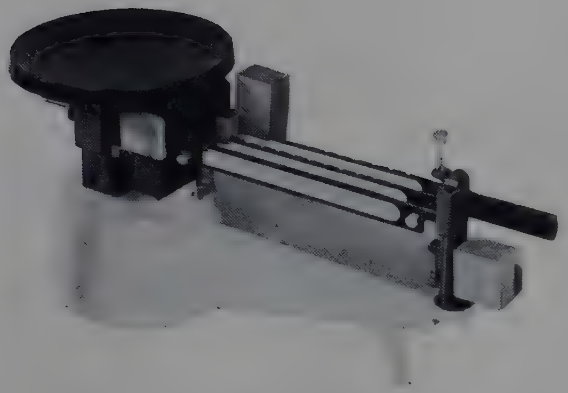
BEAM BALANCES


BC-170

BC-170

BALANCES, beam, heavy duty. A soundly constructed beam balance mounted on heavy cast base with brass pans. The 2 and 5 kg models have single beam as illustrated. The 10 kg model has a double framed beam.

Capacity	2	5	10 kg	
Pan dia. approx.	160	175	200 mm	
Each	**£15·80**	**23·50**	**26·00**	*cx*


BC-172
BC-174

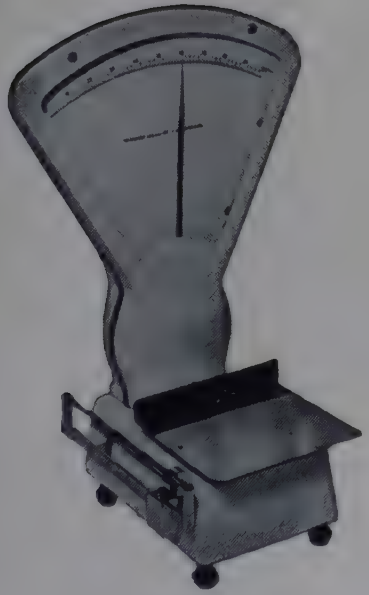
BC-172

BALANCE, triple beam, with agate planes, steel knife edges and adjustable stops to limit beam movement. Capacity 1110 g extended to 2110 g by supplementary weight. Beams calibrated 0–10 g by 1 g, subdivided 0·1 g, 0–100 g by 10 g and 0–1000 g by 100 g. With 200 mm dia. plastics pan... ... ... Each **£32·29** *fx*

BC-174

BALANCE, triple beam, as BC-172 but capacity extended to 5110 g by use of four supplementary weights. Each **£36·54** *fx*

HEAVY DUTY INDICATING BALANCES


BC-178
BC-179

BC-178

INDICATING BALANCE, heavy duty, sliding weight range 0–2200 g, with chart reading 200×1 g. Fitted with tare beam for offsetting the weight of the container. Adjustable oil damping and adjustable levelling feet. Balance finished in white vitreous enamel with stainless steel plate 20×25 cm ... Each **£105·50** *mxN*

BC-179

INDICATING BALANCE, heavy duty, as BC-178 but range 0–5500 g, chart 500×2 g and plate 23×28 cm. Each **£143·00** *mxN*

The above balances are also available with double-lipped stainless steel scoop. Details on application.

BC-182
BC-183

BC-182

INDICATING BALANCE, heavy duty, complete range 0–10 kg on one chart subdivided in 20 g. Adjustable levelling feet. Balance finished in white vitreous enamel with stainless steel plate 25×37 cm. Each **£127·00** *mxN*

BC-183

INDICATING BALANCE, heavy duty, as BC-182 but range 0–20 kg subdivided in 50 g ... Each **£127·00** *mxN*

LEVER BALANCE

BC-187

BALANCE, lever pattern, rapid weighing with dual range arc scale graduated 0–250 g in 1 g divisions and 0–1000 g in 10 g divisions, edge reading index pointer and overload stop. Mounted on heavy base fitted with levelling screw. Complete with detachable aluminium pan 150 mm dia., and a hook for specific gravity experiments. Overall dimensions: 38×30 cm. Weight 1·6 kg.
Nuffield Physics Approved Item 42 ... ... Each **£9·90** *fx*

BC-187

Gallenkamp
REGD. TRADE MARK

SEDIMENTATION BALANCE
For Particle Size Analysis

- Full range 5μ to 75μ in 6 hours
- Illuminated read-out
- Operates on 0·5 g of sample
- Optional auto-recording system

For full details see PC-650 et seq. in List No. sequence.

BC-190 to BC-215

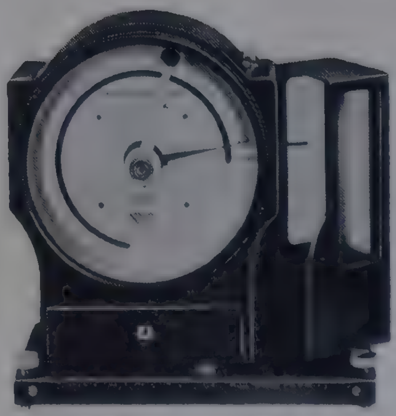
TORSION BALANCES

These torsion balances are fitted with jewelled bearings, hardened steel pivots, magnetic damping, zero adjustment, spirit level, levelling screws and a rapid action lock and release which enables the beam to be clamped regardless of the position of the beam or index pointer. The scale of 500 divisions extends about 250° (330 mm), All ranges of both models have hooks for suspending specimens, the 5 mg range also has a 10 mm pan.

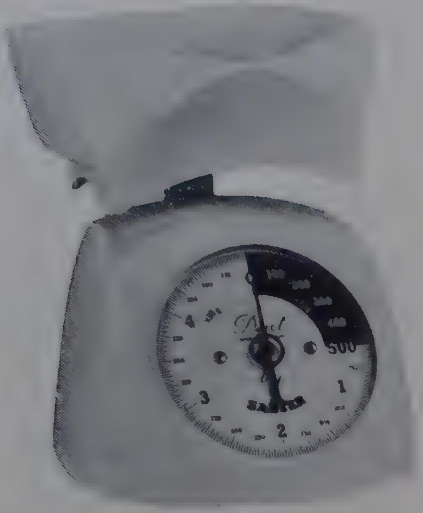
Standard model has a tripod base and a hinged cover to protect the beam and hook. It is accurate to ±0·4%.

Precision model is fitted in an enamelled steel case with a glass sided hinged enclosure for shielding the sample during weighing and a small drawer to accommodate tweezers and accessories. It is accurate to ±0·2%.

Range 0 to	Standard model		Precision model		Check weights	
	List No.	Each	List No.	Each	List No.	Set of 10
		£		£		£
5 mg	**BC-190**	**44·56** *fxN*	**BC-225**	**64·30** *fxN*	**BC-262**	**11·00** *fx*
50 mg	**BC-195**	**38·56** *fxN*	**BC-230**	**58·30** *fxN*		
500 mg	**BC-200**	**38·56** *fx*	**BC-235**	**58·30** *fxN*	**BC-264**	**11·00** *fx*
1000 mg	**BC-210**	**38·56** *fx*	**BC-240**	**58·30** *fxN*	**BC-266**	**11·00** *fx*
10 g	**BC-215**	**38·56** *fxN*	**BC-245**	**58·30** *fxN*		


BC-225 to BC-245

SPRING BALANCES



BC-490

BC-490

BALANCE, spring, dual scale model in enamelled case with taring adjustment and graduated plastics scoop. A double spring mechanism provides fine sub-divisions in the lower range combined with a large capacity. The first section of the dial is divided every 10 g up to 500 g when the second spring comes into action and the remainder of the dial is divided every 25 g up to a total capacity of 5 kg. *Salter* No. 51 ... ... Each **£4·95** *mx*

BC-510

BALANCES, spring, in metal case, with taring screw and circular tinned pan. *Salter* No. 250.

Capacity	10	25 kg	
Divisions	50	50 g	
Pan dia.	23	30 cm	
Each	**£12·50**	**18·00**	*mx*

BC-510

BC-530

BC-530

BALANCES, spring, with steel case and hook. *Salter* No. 10. Dual scale grammes/newtons.

Capacity	100	200	500	1000 g	
	1	2	5	10 newton	
Divisions	1	2	5	10 g	
	0·01	0·02	0·05	0·1 newton	
Each	**£1·10**	**1·10**	**1·10**	**1·10**	*mx*

BC-570

BALANCES, spring, in tubular brass case with steel hook. *Salter* No. 15. Metric scale.

Capacity	5	10 kg	
Divisions	100	200 g	
Each	**£2·10**	**2·10**	*mx*

BC-572

BALANCES, spring, as BC-570 but Imperial scale.

Capacity	4	10	20	40 lb	
Divisions	0·5 oz	0·1 lb	0·5 lb	0·5 lb	
Each	**£2·40**	**2·40**	**2·10**	**3·15**	*mx*

BC-570
BC-572

BC-590

BC-590

BALANCE, spring, heavy duty dial suspension type with taring adjustment, ring and hook. White scale 15 cm dia. divided in 200 g up to 50 kg. *Salter* No. 235. Each **£6·50** *mx*

BD-120

BALANCE FEET, shock absorbing. Set of three feet each comprising moulded nylon top and base separated by a soft rubber buffer to minimise vibration.

10 sets **£12·00** Set **£1·35** *bx*

BD-120

BD-180

BALANCE PLATFORM, *Gallenkamp*, **bench mounting.** Provides protection for balances and other sensitive instruments by damping virtually all vibration. The balance platform is enclosed in a polished wood case and has a flush top surface of laminated plastics sheet on a heavy cast metal plate which is suspended from a system of shock absorbers.

Overall dimensions	57 × 41 × 9 cm
Balance platform	45 × 30 cm
Weight	30 kg

Each **£37·00** *bx*

BD-180 with balance

BD-200

BALANCE TABLE, floor mounting, to provide a working surface for mounting analytical balances, galvanometers, optical levers and other vibration sensitive instruments. The table comprises a set of stone slabs and a set of sundries. The top member and two side members (which are drilled to accept the bracing bar) are of 8 cm thick grey/green mottled terrazzo stone. The sundries comprise the bracing bar, washers and flanges, and a set of rubber shock-absorbing pads. Supplied with instructions for assembly.

Overall height	76 cm
Working surface	90 × 76 cm
Net weight approx.	300 kg

Each **£102·00** *mx*

BD-200

BALANCE ACCESSORIES in other parts of the catalogue

Counterpoise bottles or tubes	see	TW-600 to TW-650
Desiccant capsule	see	DK-660
Lead shot for counterpoises	see	WT-220
Spatulas	see	SJ-050 et seq.
Watch glasses	see	BA-974
Weighing bottles	see	WT-020 et seq.
Weighing funnels	see	WT-170
Weighing scoops	see	BA-976, WT-150

BALANCE WEIGHTS

TOLERANCES ON ADJUSTMENT

Analytical weights with tolerances as specified by the National Physical Laboratory are suitable for use with high class analytical balances. For many analytical purposes a slightly lower quality is acceptable and can be provided at a considerably lower cost in the form of *Gallenkamp* analytical weights. For student and precision balances *Gallenkamp* general purpose weights are suitable. The tolerances specified for these three grades of weights are shown in the table below.

DENOMINATION		1 mg	2 mg	5 mg	10 mg	20 mg	50 mg	100 mg	200 mg	500 mg	1 g	2 g	5 g	10 g	20 g	50 g	100 g	200 g	500 g	1000 g	2000 g	5000 g
NPL	± mg	0·02	0·02	0·02	0·02	0·02	0·02	0·05	0·05	0·05	0·05	0·05	0·05	0·05	0·1	0·25	0·5	1·0	—	—	—	—
Gallenkamp analytical	± mg	0·05	0·1	0·1	0·1	0·1	0·1	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·4	1·0	2·0	4·0	—	—	—	—
Gallenkamp general purpose	± mg	—	—	—	1	1	1	1	1	1	2	3	4	6	10	15	20	30	50	100	200	500

BD-608

BD-620

BD-624

ANALYTICAL

BD-608

BALANCE WEIGHTS, ANALYTICAL, *Gallenkamp*, stainless steel with aluminium and nickel silver fractions. In plastics box with forceps. Weights arranged on 1–2–2–5 system.

10 mg to	50	100 g	
Each	**£11·25**	**12·50**	*bx*

BD-609

BALANCE WEIGHTS, ANALYTICAL, *Gallenkamp*, stainless steel, as BD-608 but without fraction weights. For use with balances having mechanical fraction weight loading. In plastics box with forceps. 1 g to 100 g arranged on 1–2–2–5 system ... ... Each **£11·25** *bx*

BD-614

BALANCE RIDER, ANALYTICAL, *Gallenkamp*, platinum wire. Weight 10 mg.
Ten **£4·20** Each **£0·47** *bx*

BD-620

BALANCE WEIGHTS, ANALYTICAL, *Oertling* WO2, stainless steel. In two tone plastics case, with stainless steel strip fractions and plastics forceps. With works certificate. 10 mg to 100 g arranged on 1–1–2–5 system ... ... Each **£28·00** *fx*

BD-624

BALANCE WEIGHTS, ANALYTICAL, *Stanton* SS8, stainless steel. In polished wooden box lined with velvet, with tipped forceps and glass cover over stainless steel fractions. Weights are checked to within NPL tolerances. 10 mg to 100 g arranged on 1–2–3–5 system.
Each **£32·00** *fx*

BALANCE WEIGHTS

GENERAL PURPOSE

Tolerances see table on page 56.

BD-650

BALANCE WEIGHTS, GENERAL PURPOSE, *Gallenkamp*, polished brass with aluminium and nickel-silver fractions. Set of weights arranged on 1–2–2–5 system in plastics box with forceps.

1 mg to	100	200 g	
10 sets	**£38·00**	**48·00**	*bx*
Set	**£ 4·20**	**5·40**	

BD-650

BD-660

BALANCE WEIGHTS, GENERAL PURPOSE, *Gallenkamp*, polished brass. Set of weights without fractions arranged on 1–2–2–5 system, in polished hardwood box.

1 g to	500	1000	2000	5000 g	
Set	**£7·30**	**10·50**	**17·50**	**45·00**	*bx*

BD-660

BD-670

BALANCE WEIGHTS, GENERAL PURPOSE, *Gallenkamp*, polished brass. Loose weights as used in sets BD-650 and BD-660.

Weight	1	2	5	10	20	50	100 g	
Ten	**£0·60**	**0·70**	**0·85**	**1·20**	**1·40**	**2·50**	**4·30**	*bx*
Each	**£0·14**	**0·14**	**0·16**	**0·19**	**0·21**	**0·31**	**0·48**	

Weight	200	500	1000	2000	5000 g	
Ten	**£8·60**	**13·40**	**26·50**	**49·00**	—	*bx*
Each	**£0·96**	**1·50**	**2·95**	**5·50**	**12·00**	

BD-672

BALANCE WEIGHTS, fractions, *Gallenkamp*, general purpose. Loose fraction, 1 mg to 5 mg aluminium and 10 mg to 500 mg nickel-silver as used in sets BD-650. In packs of 10.

Weight	1	2	5	10	20 mg	
10 packs	**£5·70**	**5·70**	**5·70**	**5·70**	**5·70**	*bx*
Pack	**£0·64**	**0·64**	**0·64**	**0·64**	**0·64**	

Weight	50	100	200	500 mg	
10 packs	**£6·80**	**6·80**	**6·80**	**6·80**	*bx*
Pack	**£0·76**	**0·76**	**0·76**	**0·76**	

BD-680

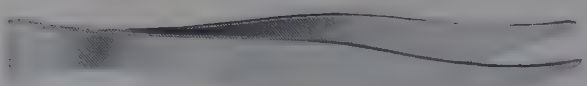
BALANCE WEIGHTS, fractions, *Gallenkamp*, general purpose. 10–500 mg nickel-silver fractions with 10 and 100 mg in duplicate, in box with hinged lid.

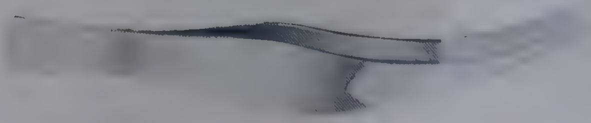
Ten **£9·00** Each **£1·00** *bx*

ACCESSORIES

BD-690 **Balance weight forceps,** nickel plated brass, with curved ends, length 9 cm.
Ten **£1·50** Each **£0·22** *cx*

BD-692 **Balance weight forceps,** stainless steel, with curved ivory tips, length 9 cm.
Ten **£14·60** Each **£1·65** *cx*


BD-690


BD-692

BE-350

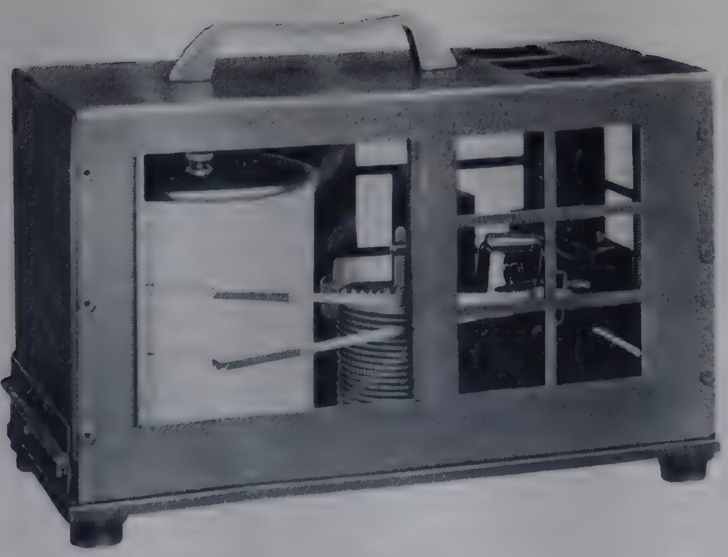
BE-380 (BE-400 is similar)

SPECIAL NOTICE

Mercury barometers are liable to damage in transit. Whenever possible we deliver in our own vans and accept all responsibility. When this is not possible we take all reasonable precautions and advise sending by passenger train 'in care of the guard', suitably insured, and for customer to meet the train on arrival. For export, we recommend 'special stowage', hung in officer's cabin.

Compensated

BE-450



BE-521

BE-350

BAROMETER, direct reading, *Darton,* with compensated silvered metal scales, range 23–31 in and 585–790 mm, on metal reflector, and thermometer. Scales subdivided 0·05 in and 0·01 mm. Mounted on polished board ... ... Each **£18·75** *mx*

BE-380

BAROMETER, Fortin, *Darton,* designed for school and college laboratories, for amateur meteorologists. With silvered metal scales, range 26–32 in and 660–810 mm, on black enamelled frame with opal reflector and thermometer graduated in °C, mounted on polished board. Vernier reading to 0·002 in and 0·05 mm. Bore of tube 7 mm nominal ... ... Each **£48·75** *mx*

BE-400

BAROMETERS, Fortin, *Darton,* with engine divided scales to 0·05 in and 1 mm. Scale reading range 26·5 in to 32·5 in and 675–820 mm. Vernier readings to 0·002 in and 0·05 mm, complete with attached thermometer graduated in °C, on polished board, with reflector.

Bore of tube (nominal)	7	8 mm	
Each	**£57·75**	**83·00**	*mx*

ACCESSORIES for BE-380 and BE-400

BE-410 **Case,** polished hardwood with glass side panels and front-opening door.

For barometer tube	7	8 mm	
Each	**£12·90**	**13·90**	*mx*

BE-430

BAROMETER, Standard Station, Kew type, *Darton,* scale range 26·5–32·5 in and 675–820 mm, with Vernier reading to 0·002 in, 0·05 mm. Complete with attached thermometer reading in °C and short arm and gimbal suspension. Bore of tube 6 mm. Each **£75·15** *mxN*

BE-450

BAROMETER, aneroid, watch form, with 4 cm dial scaled 23 to 31 inches in 0·05 inch divisions, and revolving altitude scale to 8000 ft in 100 ft divisions. Each **£17·00** *cx*

BE-521

BAROTHERMOGRAPH, *Darton,* for recording pressure and temperature on the same chart. With clockwork movement for 7-day charts in copper case. Complete with two bottles of ink and 52 charts scaled 7 days, −10 to +40°C and 950–1050 mb ... Each **£71·25** *mxN*

GLASS BASINS

BH-030

BASINS, evaporating, *Pyrex* glass, round bottom with spout.

Capacity approx.	40	75	100	250 ml	
Diameter	65	78	90	120 mm	
Depth	30	40	45	60 mm	
Std. pack qty.	36	36	36	18	
Std. pack	**£8·10**	**9·35**	**9·65**	**6·05**	*jx*
Each	**£0·30**	**0·34**	**0·35**	**0·41**	

BH-040

BASINS, evaporating, *Pyrex* glass, flat bottom with spout.

Capacity approx.	25	100	150	200 ml	
Diameter	60	80	90	105 mm	
Depth	25	45	50	55 mm	
Std. pack qty.	36	72	72	48	
Std. pack	**£8·10**	**19·30**	**20·10**	**14·05**	*jx*
Dozen	**£2·85**	**3·50**	**3·70**	**3·80**	
Each	**£0·30**	**0·36**	**0·37**	**0·37**	

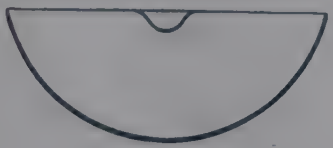
Capacity approx.	350	700	1500 ml	
Diameter	125	150	200 mm	
Depth	65	80	100 mm	
Std. pack qty.	36	24	18	
Std. pack	**£14·15**	**13·30**	**16·60**	*jx*
Each	**£ 0·47**	**0·64**	**1·06**	

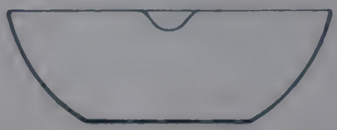
BH-070

BASINS, crystallising, *Pyrex* glass, flat bottom, without spout.

Capacity approx.	150	175	250	375 ml	
Diameter	70	80	94	102 mm	
Depth	50	40	50	50 mm	
Std. pack qty.	24	24	18	18	
Std. pack	**£5·15**	**6·40**	**4·90**	**5·20**	*jx*
Each	**£0·29**	**0·34**	**0·35**	**0·37**	

Capacity approx.	650	1200	1850	2500 ml	
Diameter	125	150	170	190 mm	
Depth	65	75	90	100 mm	
Std. pack qty.	12	8	8	6	
Std. pack	**£4·75**	**4·45**	**6·55**	**5·60**	*jx*
Each	**£0·45**	**0·60**	**0·90**	**1·02**	


BH-030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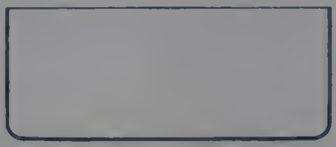
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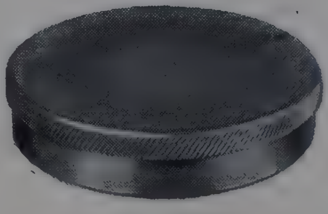
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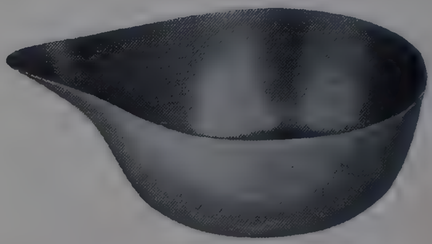
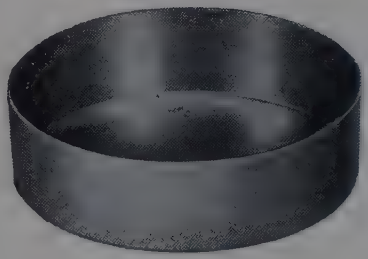

BH-205


BH-220

METAL BASINS

BH-185

BASINS, aluminium, with lid, for the determination of moisture in coal as specified in BS 1016 Part 1.

Capacity approx.	13	45 ml	
Diameter	35	65 mm	
Depth	14	14 mm	
Ten	**£7·00**	**7·60**	cx
Each	**£0·78**	**0·84**	

BH-205

BASIN, nickel, with large spout, 75 mm diameter, 35 mm deep. Capacity approx. 100 ml.

Ten **£20·00** Each **£2·25** cx

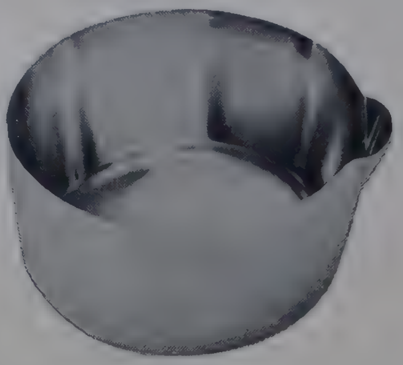
BH-220

BASINS, nickel, flat form, without spout, for milk analysis, etc.

Capacity approx.	45	70	170 ml	
Diameter	55	70	85 mm	
Depth	19	19	30 mm	
Ten	**£6·00**	**7·40**	**11·60**	cx
Each	**£0·66**	**0·82**	**1·30**	

continued overleaf

BH-230



BH-260

METAL BASINS

(continued)

BH-230

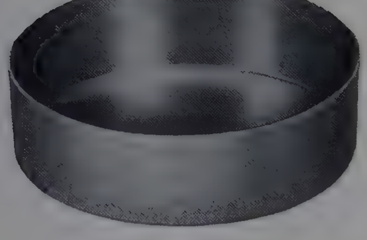
BASINS, nickel, flat form, with drop-on cover with knob.

Capacity approx.	45	100 ml	
Diameter	60	90 mm	
Depth	16	16 mm	
Ten	**£12·60**	**17·50**	*cx*
Each	**£ 1·40**	**1·95**	

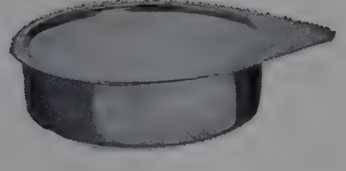
BH-260

BASINS, platinum, with spout, dimensions nominal.

Capacity	35	50	100 ml	
Diameter	50	53	70 mm	
Approx. weight	14	18	37 g	
Each	**£50·00**	**68·00**	**125·00**	*fxN*



BH-280



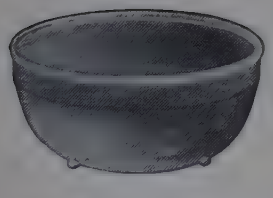
BH-285

BH-280

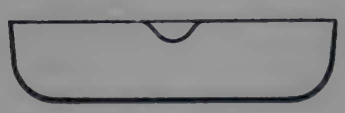
BASIN, stainless steel, polished, for milk analysis, 70 mm dia. 15 mm deep. Capacity approx. 55 ml.
Ten **£12·00** Each **£1·35** *cx*

BH-285

BASIN, stainless steel, polished, for condensed milk analysis, 85 mm dia., 22 mm high with drop-in lid, with projecting handle at one side. Capacity approx. 120 ml.
Ten **£15·00** Each **£1·70** *cx*



BH-345



BH-400

PLASTICS BASINS

BH-345

BASINS, polypropylene, without spout.

Capacity approx.	200	700	1500	3000 ml	
Diameter	100	150	200	250 mm	
Depth	45	60	85	105 mm	
Ten	**£0·75**	**1·40**	**2·40**	**3·20**	*cx*
Each	**£0·15**	**0·21**	**0·30**	**0·38**	

For properties of polypropylene see page heading PLASTICS.

PORCELAIN BASINS

BH-400

BASINS, evaporating, *Royal Worcester* porcelain, flat form, with spout, glazed inside and out.

No.	1	2	2b	
Capacity	50	75	100 ml	
Diameter	75	85	95 mm	
Depth	20	22	25 mm	
Ten	**£2·70**	**3·30**	**4·50**	*mx*
Each	**£0·33**	**0·39**	**0·50**	
No.	3	5	6	
Capacity	140	300	450 ml	
Diameter	100	125	147 mm	
Depth	27	40	43 mm	
Ten	**£5·10**	**7·20**	**8·60**	*mx*
Each	**£0·57**	**0·80**	**0·96**	

BASINS, special purpose, will be found under the following headings

Ignition capsules see DISHES
Petri dishes see CULTURE
Sand bath dishes see SAND BATHS

See also entries under headings

DISHES, PLATES and **TRAYS.**

PORCELAIN BASINS
(continued)

BH-420

BASINS, evaporating, *Royal Worcester* porcelain, shallow form, with spout, sizes up to and including No. 5 glazed inside and out, other sizes unglazed on lower portion outside.

No.	00	0	1	2	3	
Capacity	75	85	125	150	225 ml	
Diameter	75	85	90	95	109 mm	
Depth	31	35	37	40	45 mm	
Ten	**£2·30**	**2·85**	**3·20**	**4·05**	**4·80**	*mx*
Each	**£0·30**	**0·35**	**0·38**	**0·46**	**0·53**	

No.	4	5	6	6b	
Capacity	250	375	550	850 ml	
Diameter	115	127	157	178 mm	
Depth	48	53	50	62 mm	
Ten	**£5·45**	**6·95**	**8·40**	**12·20**	*mx*
Each	**£0·60**	**0·78**	**0·94**	**1·35**	

No.	7	8	8a	9	
Capacity	1100	1600	1900	3000 ml	
Diameter	200	225	245	280 mm	
Depth	62	70	77	88 mm	
Ten	**£13·85**	**21·00**	**23·25**	**31·65**	*mx*
Each	**£ 1·55**	**2·35**	**2·60**	**3·40**	

BH-430

BASINS, evaporating, *Royal Worcester* porcelain, deep form, with spout, glazed inside and out.

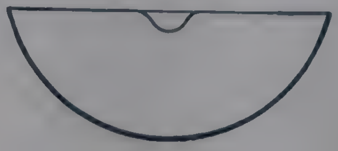
No.	5/0	4/0	3/0	00	00a	
Capacity	12	50	75	175	250 ml	
Diameter	42	63	73	95	100 mm	
Depth	20	31	38	47	59 mm	
Ten	**£1·53**	**1·80**	**2·50**	**3·95**	**5·20**	*mx*
Each	**£0·23**	**0·25**	**0·31**	**0·45**	**0·58**	

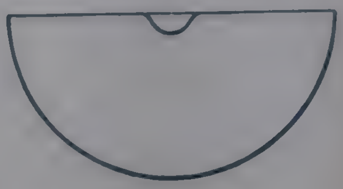
No.	0	1	2	3	
Capacity	350	650	1200	1700 ml	
Diameter	105	150	185	200 mm	
Depth	62	64	77	89 mm	
Ten	**£6·30**	**8·75**	**12·25**	**15·90**	*mx*
Each	**£0·72**	**0·98**	**1·35**	**1·80**	

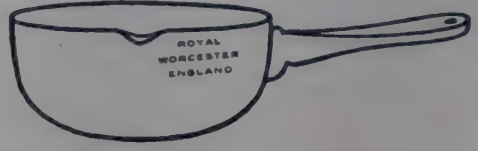
BH-460

BASINS, with handle (casseroles) *Royal Worcester* porcelain, with spout.

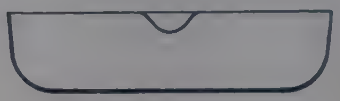
No.	2	3	4	5	
Capacity	80	175	400	700 ml	
Diameter	70	90	115	140 mm	
Depth	35	45	60	80 mm	
Ten	**£7·10**	**9·75**	**16·10**	**21·50**	*mx*
Each	**£0·80**	**1·10**	**1·80**	**2·40**	


BH-420
BH-510


BH-430
BH-521



BH-460


BH-500

SILICA BASINS

BH-500

BASINS, evaporating, *Vitreosil,* translucent fused silica, flat form, glazed, with spout.

No.	F1	F2	F5	F3	F4	
Capacity	20	25	60	75	125 ml	
Diameter	69	78	94	100	130 mm	
Depth	15	15	24	20	23 mm	
Ten	**£10·50**	**11·00**	**12·30**	**13·50**	**18·60**	*fx*
Each	**£ 1·18**	**1·25**	**1·35**	**1·50**	**2·05**	

BH-510

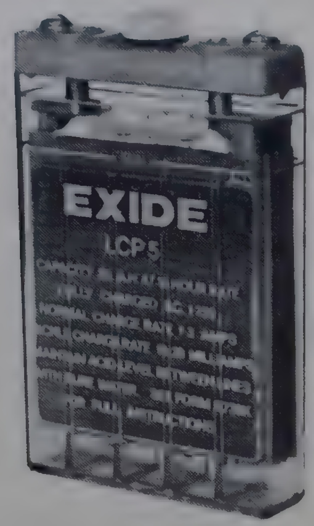
BASINS, evaporating, *Vitreosil,* translucent fused silica, shallow form, glazed, with spout.

No.	B1	B3	B5	B9	B10	
Capacity	20	45	70	100	200 ml	
Diameter	55	75	87	100	113 mm	
Depth	23	27	33	38	47 mm	
Ten	**£9·10**	**10·50**	**11·00**	**14·70**	**17·00**	*fx*
Each	**£1·02**	**1·18**	**1·25**	**1·65**	**1·90**	

BH-521

BASINS, evaporating, *Vitreosil,* translucent fused silica, deep form, glazed inside only, with spout.

No.	B11	B12	B17	
Capacity	400	500	800 ml	
Diameter	142	137	187 mm	
Depth	62	66	70 mm	
Ten	**£47·00**	**51·00**	**64·00**	*mx*
Each	**£ 5·30**	**5·80**	**7·20**	



BJ-160 to BJ-166

BATTERIES

(Accumulators, secondary cells)

BATTERIES, *Exide* multi-plate type. Single 2V cells in transparent plastics containers, supplied dry and uncharged.

List No.	Type	A.h. capacity at 10 h rate	Overall dimensions mm W.	L.	H.	Each £	
BJ-160	LCP5	20	129	35	203	**3·10**	*mx*
BJ-162	LCP9	40	129	54	203	**4·30**	*mx*
BJ-164	LCP13	60	129	115	203	**5·60**	*mx*
BJ-166	LCP17	80	129	115	203	**6·95**	*mx*

VOLTAGE REFERENCE BATTERY see EF-490.

LOW VOLTAGE SUPPLY UNITS see ED-910 et seq.

For details and prices see entries in List No. sequence.

BJ-240

BATTERY CHARGERS

BJ-240

BATTERY CHARGER for 6 and 12V batteries, charging at 1·5A max. Comprising transformer, selenium rectifier and clear scale ammeter housed in a louvred steel case designed for wall and bench mounting. Supplied with connecting leads and clips. For 200/250V 50 Hz single phase supplies ... ... Each **£5·25** *mx*

BJ-250

BJ-250

BATTERY CHARGER, as BJ-240, but charging at up to 5A ... ... Each **£9·50** *mx*

BJ-256

BJ-256

BATTERY CHARGER, for 2V, 6V and 12V batteries charging at 1 to 5A. Comprising transformer, rectifier, fuses and ammeter in a metal case, complete with mains input cable and shrouded output terminals. Overall dimensions 20×28×18 cm. For 200/250V 50 Hz single phase supplies ... ... Each **£15·80** *mx*

Gallenkamp BATHS

Embedding **Floating-out**	see	HISTOLOGY
Extraction	see	EXTRACTION APPARATUS
Oil	see	OIL BATHS
Refrigerated	see	WATER BATHS
Sand	see	SAND BATHS
Thermostatic **Water**	see	WATER BATHS
Viscometer	see	VISCOMETRY

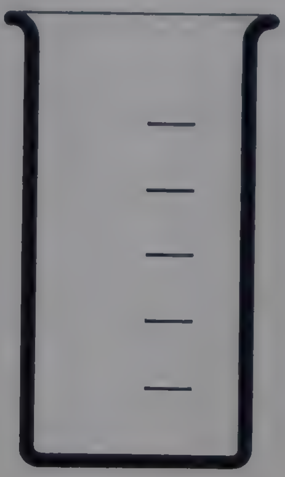
TALL FORM BEAKERS

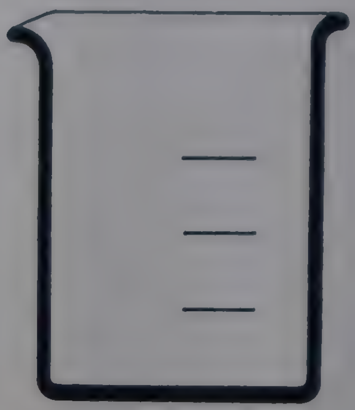
BJ-625

BEAKERS, tall form, without spout, *Pyrex* glass, with three or more graduations showing approximate capacities.

Capacity	50	100	150	250	400 ml	
Std. pack qty.	144	96	96	72	72	
Std. pack	**£20·60**	**15·40**	**16·65**	**14·15**	**16·75**	*jx*
Dozen	**£ 1·95**	**2·10**	**2·30**	**2·55**	**3·00**	
Each	**£ 0·23**	**0·24**	**0·26**	**0·28**	**0·32**	

Capacity	600	1000	2000 ml	
Std. pack qty.	72	36	12	
Std. pack	**£20·60**	**15·90**	**9·80**	*jx*
Six	**£ 1·95**	—	—	
Each	**£ 0·37**	**0·52**	**0·92**	


BJ-625


BJ-655

SQUAT FORM BEAKERS

BJ-655

BEAKERS, squat form, with spout, *Pyrex* glass. Capacities above 25 ml have two or more graduations showing approximate capacities.

Capacity	5	10	25 ml	
Std. pack. qty.	60	60	120	
Std. pack	**£8·65**	**8·65**	**17·15**	*jx*
Dozen	**£1·85**	**1·85**	**1·90**	
Each	**£0·22**	**0·22**	**0·23**	

Capacity	50	100	150	250	
Std. pack qty.	144	120	96	96	
Std. pack	**£20·60**	**19·30**	**17·20**	**18·85**	*jx*
Dozen	**£ 1·95**	**2·15**	**2·40**	**2·60**	
Each	**£ 0·23**	**0·25**	**0·26**	**0·28**	

Capacity	400	500	600	800	
Std. pack qty.	60	60	60	48	
Std. pack	**£14·00**	**14·65**	**16·80**	**16·85**	*jx*
Dozen	**£ 3·00**	**1·65**	**1·90**	**2·30**	
Each	**£ 0·32**	**0·33**	**0·37**	**0·43**	

Capacity	1000	2000	3000	5000 ml	
Std. pack qty.	36	12	12	6	
Std. pack	**£15·90**	**9·80**	**14·45**	**10·55**	*jx*
Each	**£ 0·52**	**0·92**	**1·35**	**1·95**	

BJ-695

CONICAL FORM BEAKERS

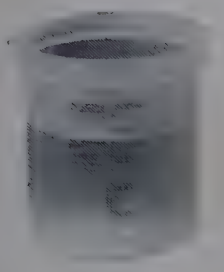
BJ-695

BEAKERS, conical form, wide mouth, with spout, *Pyrex* glass.

Capacity	125	250	400 ml	
Std. pack qty.	96	72	72	
Std. pack	**£21·65**	**18·85**	**20·30**	*jx*
Dozen	**£ 3·00**	**3·40**	**3·70**	
Each	**£ 0·31**	**0·35**	**0·37**	

Capacity	500	650	1000 ml	
Std. pack qty.	60	48	36	
Std. pack	**£21·10**	**20·00**	**19·00**	*jx*
Six	**£ 2·35**	**2·75**	—	
Each	**£ 0·44**	**0·50**	**0·62**	

continued overleaf



BJ-835

BJ-840

BJ-860

BJ-910

BJ-950

PLASTICS BEAKERS

When selecting please note the properties of plastics materials given under the page heading PLASTICS.

BJ-835

BEAKERS, polypropylene, squat form, with spout.

Capacity	25	50	100	250	400 ml	
Ten	**£0·60**	**0·70**	**0·80**	**1·00**	**1·40**	mx
Each	**£0·14**	**0·16**	**0·16**	**0·22**	**0·28**	

Capacity	600	1000	2000	5000 ml	
Ten	**£1·80**	**2·40**	**3·20**	—	mx
Each	**£0·25**	**0·30**	**0·38**	**2·40**	

BJ-840

BEAKERS, expendable clear polystyrene, squat form, 20 ml. Useful for medical and radioisotope work. In pack of 100... ... 10 packs **£5·90** Pack **£0·66** cx

*__BJ-860__

BEAKERS, ptfe, squat form, inert to most chemicals except molten alkali metals and fluorine, and can thus replace platinum for many purposes. Suitable for use up to 300°C.

Capacity	50	100	150	250	500	1000 ml	
Each	**£2·55**	**2·80**	**3·00**	**3·80**	**6·00**	**12·00**	cx

METAL BEAKERS

BJ-910

BEAKERS, stainless steel, with spout.

Capacity approx.	200	350	550	700	1250 ml	
Diameter	60	65	75	75	100 mm	
Height	75	115	125	165	165 mm	
Each	**£1·60**	**1·75**	**2·30**	**2·90**	**2·90**	mx

BEAKER COVERS

BJ-950

BEAKER COVERS, polythene, with radial ribs to raise cover from the beaker and allow evaporation.

Diameter	95	108 mm	
Ten	**£5·00**	**5·20**	cx
Each	**£0·55**	**0·58**	

EJ-105 Beaker cover, polythene, with slot...
WE-025 et seq. Watch glasses for use as beaker covers ... ...
See entries in List No. sequence.

BRUSHES for cleaning beakers see BU-430 and BU-434

HEATERS for squat form beakers see HD-752 to HD-760

TONGS for handling beakers see TS-250 to TS-262

JUGS, graduated see JV-110 et seq.

MEASURES, graduated see MB-870 et seq.

For details and prices see entries in List No. sequence.

BELL JARS

***BK-321**

BELL JARS, soda-lime glass, with knob and ground flange.

Height to shoulder	22·5	25	30 cm	
Dia. inside flange	12·5	15	20 cm	
Ten	**£22·90**	**27·40**	**62·00**	*mx*
Each	**£ 2·55**	**3·10**	**6·80**	

***BK-332**

BELL JARS, soda-lime glass, with ground flange and socket. **Without stopper or stopcock.**

Height to shoulder	22·5	25	30 cm	
Dia. inside flange	12·5	15	20 cm	
Socket	29/32	29/32	29/32	
Ten	**£24·90**	**29·60**	**66·00**	*mx*
Each	**£ 2·80**	**3·30**	**7·40**	

ACCESSORIES

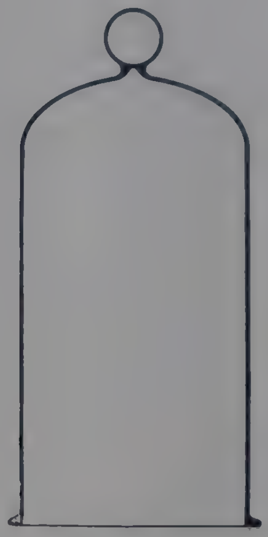
BK-343 **Stopcock,** glass, cone 29/32.
Ten **£23·50** Each **£2·60** *mx*

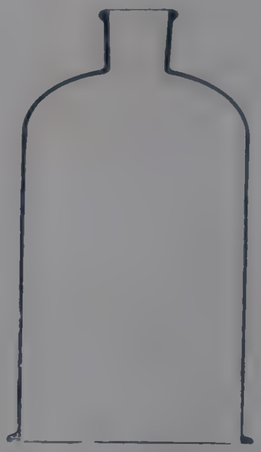
SU-710 **Stopper,** polypropylene, cone 29/32. For price see entry in List No. sequence.

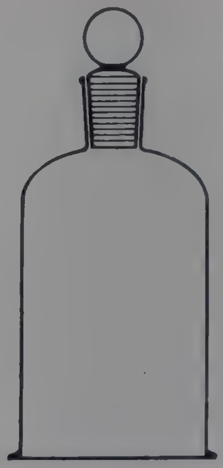
Q-SB29 **Stopper,** glass, cone 29/32. For price see entry in *Quickfit* section.

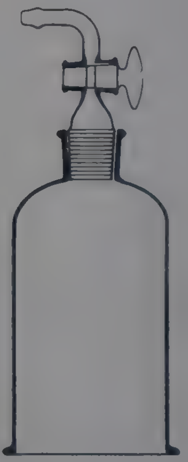
BK-345 **Bases,** plate glass, frosted one side.

Size	20×20	25×25 cm	
For jar dia.	12·5, 15	20 cm	
Ten	**£3·70**	**4·50**	*cx*
Each	**£0·43**	**0·50**	


BK-321


BK-332


BK-332 with stopper


BK-332 with stopcock

BELLOWS

BK-620

BELLOWS, foot, designed to give a steady air pressure and thus be suitable for glassblowing purposes. Overall dimensions, including step and air pipe, 38×30×18 cm.
Each **£11·20** *cx*

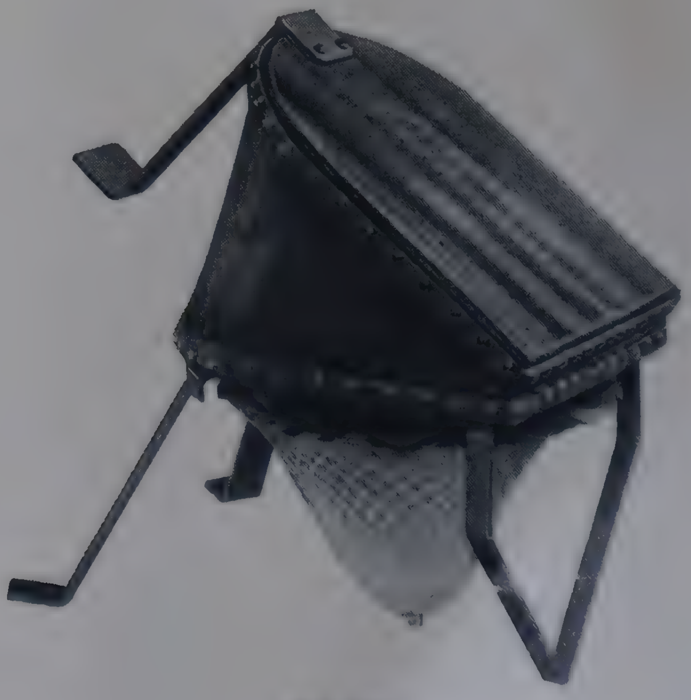
REPLACEMENT PARTS

BK-622 **Rubber disk,** 30 cm dia.... ... ... Each **£0·60** *cx*

BK-624 **String net,** to limit expansion of rubber disks.
Each **£0·60** *cx*

**HAND OPERATED
BELLOWS and BLOWBALLS**

See RV-030 to RV-080 in List No. sequence.


BK-620

BIOLOGY

This section lists specialised apparatus for biological sciences. As most schools and colleges assemble their own apparatus for plant physiological experiments, we list only the special glass parts for such experiments.

Other more general apparatus used in biology but not listed in this section will be found either in alphabetical sequence or under particular headings as indicated in the following lists.

To be found in alphabetical sequence.

Bell jars
Calorimeters
Chromatography
Colorimeters
Culture
Dissecting
Freeze drying
Histology
Incubators
Magnifiers
Microscopes
Microtomes
Refrigerators
Sintered glass plates

To be found under headings as indicated.

Anaerobic culture jars	see	Culture
Aerators	see	Air pumps
Cobalt chloride paper	see	Test papers
Colony counter	see	Culture
Cork borers for cutting leaf sections	see	Cork accessories
Cork slabs for mounting	see	Corks
Dewar vacuum flasks	see	Vacuum flasks
Dropping bottles	see	Bottles, dropping
Macerators	see	Mixers
Moisture tensiometer	see	Soil testing
Pneumatic troughs for osmosis experiments	see	Gas collecting
Porcelain tiles with cavities	see	Tiles
Slides and cover slips	see	Histology
Slide drying plate	see	Histology
Specimen tubes	see	Tubes, specimen
Thunberg tubes	see	Medical sciences
Whirling hygrometer	see	Hygrometers

BL-101

BL-101

AQUARIA, nylon coated angle iron frame. This finish, together with a resilient plastics cement securing the glass panels, provides aquaria which are resistant to rust and leakage. 30 cm wide by 30 cm deep.

Length	60	90	120 cm	
Each	**£11·60**	**15·50**	**21·00**	*cx*

TB-550 to TB-600

AQUARIA, glass, see entries in List No. sequence.

AF-380 to AF-400

AERATORS, suitable for aquarium use, see entries in List No. sequence.

BL-110

DIFFUSER STONE, square, with long plastics tube stem for connection to aerator ... ... Each **£0·15** *cx*

BL-125

AQUARIUM HEATER, mounted in a glass tube, length 13 cm, dia 2 cm. Heater rating 100W. With connecting cable. For 200/250V supplies ... ... Each **£0·60** *cx*

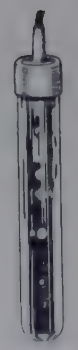
BL-135

AQUARIUM THERMOSTAT, mounted in a glass tube, length 13 cm, dia. 2 cm. Controls to ±2degC. Supplied set at approximately 25°C and adjustable between 18°C and 30°C. Includes integral indicator lamp and supplied with cable ... ... Each **£0·90** *mx*

DK-640

DESICCATOR CABINET, clear plastics. Suitable for plant growth studies. For details and price see entry in List No. sequence.

BL-110



BL-135

BL-285

MOUNTING BOXES, rectangular, stiff card, white inside, with glazed lid.

Length	10	15	18 cm	
Width	6	10	13 cm	
Height	3	5	7 cm	
Ten	**£2·80**	**3·80**	**4·80**	*cx*
Each	**£0·34**	**0·44**	**0·53**	

BT-820

BOXES, clear polystyrene, circular, suitable for use as entomological mounting boxes. See entry in List No. sequence.

CV-050

CORK SHEET, suitable for cutting insert bases for above boxes, also for general specimen mounting purposes. See entry in List No. sequence.

BL-300

VASCULA, enamelled aluminium, complete with webbing straps. Dimensions 32×16×6 cm. Each **£4·90** *mx*

BL-320

PRESS, woven wire, galvanised finish, 45×30 cm fitted with webbing straps allowing for capacity up to approx. 10 cm thickness ... ... Each **£2·90** *mx*

BL-420

CLINOSTAT, electric, driven at four revolutions per hour. Can be inclined at any angle from 0° to 90°. Supplied complete with cork disk, plastics cover and bottle holder, and suitable for 200/250V 50 Hz a.c. supplies only ... ... Each **£13·00** *mx*

BL-500

RESPIROMETER, (AG), **Ganong,** graduated and levelling tubes only ... ... Each **£5·40** *ax*

BL-520

ABSORPTION TUBE, (AG), **Pettenkoffer,** for estimation of carbon dioxide produced in respiration.
Each **£2·00** *ax*

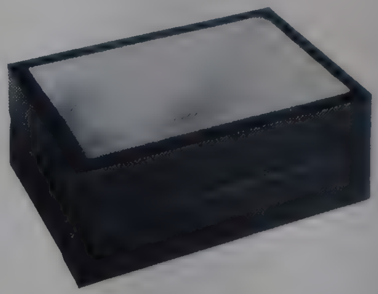
BL-610

POTOMETER, (AG), **Ganong,** with 10/13 joint, for measuring transpiration rates, including funnel tube.
Each **£4·50** *ax*

COLONY COUNTER see **CX-300**

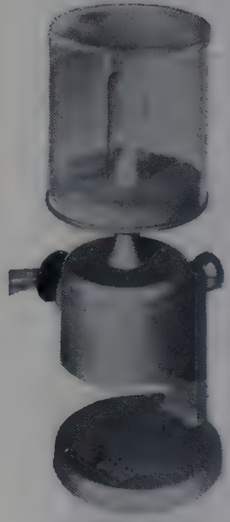
MAGNIFIERS see **MA-660** et seq.

SINTERED GLASS PLATES for seed testing and growing excised embryos see **SF-500** et seq.


BL-285

BL-300

BL-320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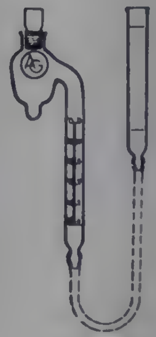
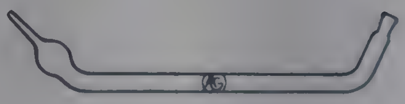

BL-500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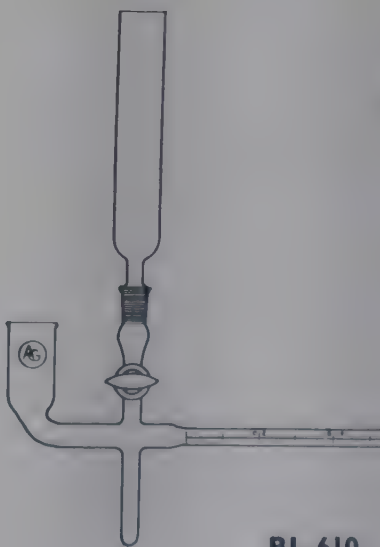
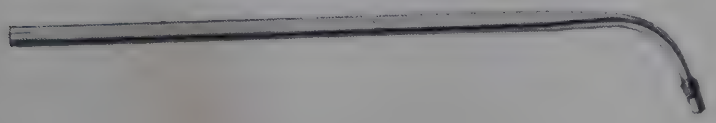

BL-610

BLACKBOARD see FURNITURE
BLOOD TESTING see MEDICAL SCIENCES
BLOWBALLS see RUBBER SUNDRIES



BR-036

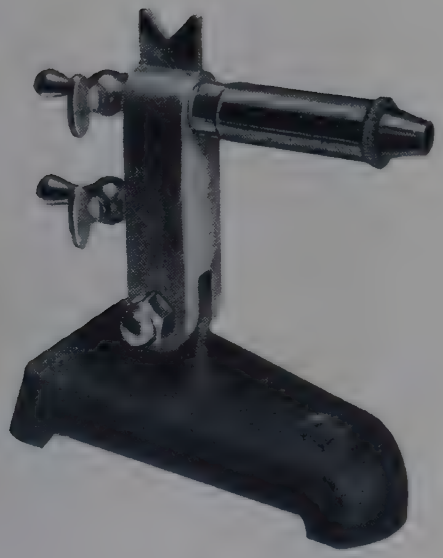
BR-036
BLOWPIPE, nickel plated brass, curved, length 20 cm.
Ten **£2·30** Each **£0·30** *cx*

BR-050
CHARCOAL BLOCKS, compressed, for blowpipe analysis, 50 × 30 × 30 mm ... Ten **£0·60** Each **£0·13** *cx*

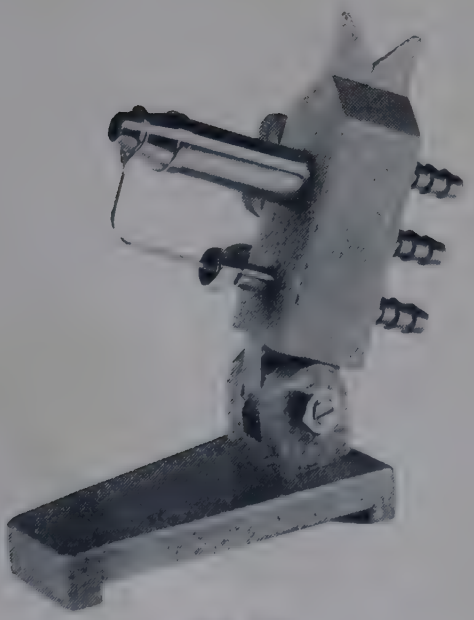
BR-055
COBALT GLASS PLATES, for blowpipe analysis, 75 × 25 mm... ... ... Ten **£0·55** Each **£0·13** *cx*

PLATINUM WIRE see PR-680
WIRE HOLDER see CX-560
For details and prices see entries in List No. sequence.

GLASSWORKING BLOWPIPES



BR-150



BR-175

BR-150
BLOWPIPE, *Gallenkamp,* for use with coal gas and compressed air. Capable of giving a wide range of flames suitable for working soda-lime glass. Fitted with separate gas and air taps and a V-notch for glass cutting and shaping. Supplied complete with three interchangeable jets.
Ten **£82·00** Each **£9·20** *bx*

BR-175
BLOWPIPE, *Gallenkamp,* for use with natural (methane) gas, LPG (butane/propane) or coal gas with compressed air or oxygen air mixtures. A supply of oxygen is required for the flame stabilising bleed. The blowpipe is capable of giving a range of flames for working soda-lime and borosilicate glasses. Separate taps for gas, air and oxygen are provided and an oxygen bleed, controlled by a needle valve, is used to stabilise the flame. The use of this bleed prevents the flame from breaking away from the burner tube particularly when using natural gas. A joint on the heavy base provides vertical angled adjustment of the burner tube. Inlet nozzles accept 10 mm bore flexible tubing. With integral V-notch for glass cutting and shaping and three interchangeable jets. Each **£18·00** *bx*

Gas cylinder fittings, control valves, etc. for oxygen or LPG cylinders for use with any of above blowpipes, see GAS CYLINDERS. Glassblowing tools see GP-100 et seq. in List No. sequence.

BLOWPIPES
(continued)

BR-215

BR-215

BLOWPIPE. A hand held or free standing butane burner capable of giving from a fine needle to a large brush flame by adjustment of the gas control needle valve. Complete with butane canister and instructions for use.
Each **£2·25** *mx*

REPLACEMENT PART

PF-176	**Butane canisters.** For details and price see entry in List No. sequence.

BR-220

BR-220

BLOWPIPE, Bornkessel, hand type, for burning coal gas with air. With separate regulating taps giving fine flame control ... ... Each **£7·80** *mx*

BR-240 with BR-245

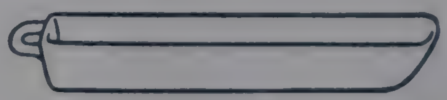
BR-240

BLOWPIPE, *Flamemaster,* hand torch, complete with Miniflame unit and nozzle cap. Suitable for burning coal gas and natural gas with air (or air/oxygen mixture when using BR-242) and capable of giving from a large brush to a small needle flame. With economiser trigger which cuts air and gas down to a pilot flame when the operator's grip is relaxed. Rapid action needle valve controls.
Each **£12·40** *fx*

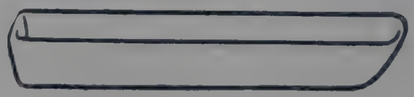
REPLACEMENTS AND ACCESSORIES

BR-242	**Oxygen-air mixer.** Enables Miniflame unit to be used for working borosilicate glass	Each	**£5·50**	*fx*
BR-245	**Maxiflame unit,** to replace Miniflame unit in BR-240 for burning butane, coal gas or natural gas with compressed air. Comprises jet and nozzle assembly capable of producing a flame suitable for brazing	Each	**£2·50**	*fx*
BR-246	**Oxyflame units, set of three,** to replace Miniflame unit in BR-240, for burning butane, coal gas, methane or hydrogen with oxygen only. Capable of giving three sizes of hot flame for brazing and light welding.	Set	**£4·05**	*fx*
BR-250	**Soldering attachment,** converts torch into soldering iron with adjustable heat control for light soldering.	Each	**£3·40**	*fx*
BR-252	**Bench clamp,** converts BR-240 into bench blowpipe.	Each	**£2·50**	*fx*
BR-254	**Tubing,** twin bore, with clip, in 3 metre lengths.	Each	**£1·15**	*fx*

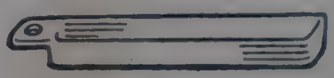
BOATS



BR-620
BR-640



BR-681



BR-730

BR-620

BOATS, combustion, *Royal Worcester* porcelain, glazed, with handle.

No.	2	3	4	7	
Length	60	70	75	100 mm	
Width	10	6	11	18 mm	
Height	6	6	6	12 mm	
Ten	**£1·55**	**1·75**	**2·10**	**3·85**	*mx*
Each	**£0·23**	**0·24**	**0·28**	**0·45**	

BR-640

BOATS, combustion, *Vitreosil* translucent silica, glazed, with handle.

No.	1	2	3	4	
Length	50	80	80	100 mm	
Width	15	17	20	20 mm	
Height	10	11	13	12 mm	
Ten	**£6·80**	**8·70**	**10·10**	**12·20**	*fx*
Each	**£0·76**	**0·98**	**1·14**	**1·35**	

BR-681

BOATS, combustion, highly refractory material, specially made for analysis of carbon and sulphur in steel. Batch tested for carbon and sulphur blanks. In packs of 100.

Length	73	91	98 mm	
Width	15	18	17 mm	
Height	13	14	12 mm	
Pack	**£2·30**	**2·30**	**2·30**	*cx*

BR-730

BOATS, micro combustion, *Royal Worcester* porcelain, glazed, with handle, made to BS 1428, Part I1.

No.	1	2	3	
Length excluding handle	14	26	46 mm	
Length overall	21	34	55 mm	
Depth	2	3	4 mm	
Ten	**£1·25**	**1·35**	**1·60**	*mx*
Each	**£0·20**	**0·21**	**0·23**	

CRUCIBLES see CW-210 et seq.
IGNITION DISHES see DM-280 et seq.
For details see entries in List No. sequence.

BOTTLES

INDEX

to bottles in this section and under other headings in the catalogue.

	Page or Title
Aspirator bottles	Aspirators
Balsam bottles	Histology
Burette reservoir bottles	Burettes
Centrifuge bottles	Centrifuges
Culture bottles	Culture
Density bottles	Density
Dispensing bottles	80
Drechsel bottles	Gas washing
Dropping bottles	80
Gas washing bottles	Gas washing
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Universal containers	Culture
Washbottles...	Washbottles
Weighing bottles	Weighing
Winchester bottles...	72
Woulff bottles	Gas washing

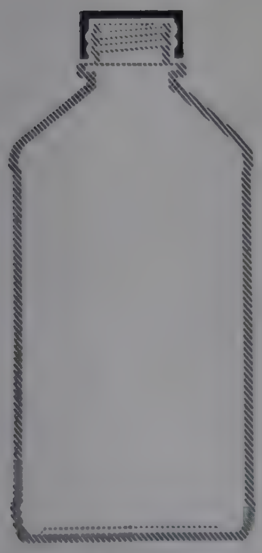
BOTTLE CAPACITIES

All bottle capacities listed in this catalogue are nominal capacities.

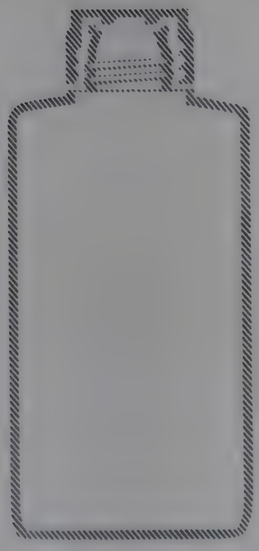
In view of the general use of metric units in laboratories, all capacities are listed in a conventional metric series. Bottles manufactured to nominal capacities in other units have been converted to metric in accordance with the following table.

Manufacturers nominal capacity quoted in			Metric equivalent	
oz	lb	gal	Calculated ml	Listed nominal ml
½			14	15
1			28	30
2			57	60
4			114	125
6			171	175
8			227	250
12			341	350
16	1		454	500
			litres	litres
32	2		0·91	1
64	4		1·82	2
80		½	2·27	2
90			2·56	2·5
160		1	4·55	4·5
		2	9·09	9
		5	22·73	22

GENERAL PURPOSE BOTTLES



BT-100



BT-105

When selecting please note the properties of plastics materials given under the page heading PLASTICS

NARROW NECK, PLASTICS

BT-100

BOTTLES, polythene, narrow neck, fitted with urea screw cap and vinyl faced liner.

Capacity	60	125	250	500 ml	
Thread R4/	20	20	20	24	
100	£6·00	8·40	10·00	13·40	cx
10	£0·66	0·94	1·08	1·50	
Each	£0·14	0·16	0·18	0·22	

Capacity	1000	2000	4500 ml	
Thread	R3/33	R4/31	R4/31	
100	£20·50	27·00	39·00	cx
10	£ 2·25	3·00	4·30	
Each	£ 0·29	0·36	0·48	

BT-350 Screw caps, spare for above bottles, see entry in List No. sequence.

BT-105

BOTTLES, polypropylene, narrow neck fitted with polypropylene screw cap. Can be sterilised in an autoclave up to 135°C. In packs of 10.

Capacity	30	60	125	250	500	1000 ml	
10 packs	£6·50	6·80	7·90	13·00	17·00	35·00	mx
Pack	£0·80	0·90	1·00	1·40	2·20	4·30	

GENERAL PURPOSE BOTTLES

NARROW NECK, GLASS

BOTTLES, plastics-stoppered reagent, narrow neck ground interchangeably and fitted with hexagonal head red polypropylene stoppers.

Capacity	30	60	125	250	500	1000 ml
Neck size	16/16	16/16	19/22	24/29	24/29	29/32

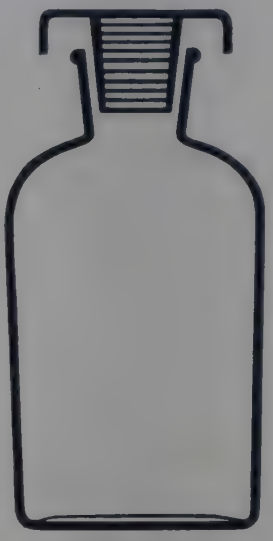
BT-140 in clear white glass

100	£17·50	18·50	19·50	21·50	28·00	41·00	*mx*
10	£ 1·95	2·05	2·15	2·40	3·10	4·50	
Each	£ 0·26	0·27	0·28	0·30	0·37	0·50	

BT-142 in amber glass

100	£28·00	29·00	33·00	38·00	46·00	72·00	*mx*
10	£ 3·10	3·20	3·60	4·20	5·10	8·00	
Each	£ 0·37	0·38	0·42	0·47	0·56	0·90	

SU-700
SU-710
SU-712 } **STOPPERS, polypropylene,** interchangeable, in several colours suitable for colour coding. For prices see entries in List No. sequence.



BT-140
BT-142

BOTTLES, glass-stoppered reagent, narrow neck with interchangeable ground glass stopper.

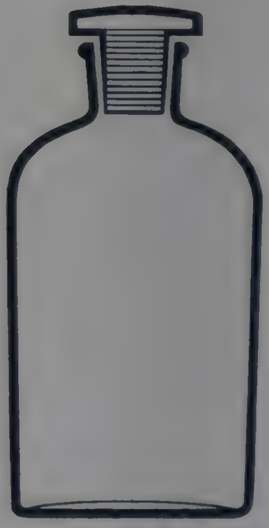
Capacity	30	60	125	250	500	1000 ml
Neck size	16/16	16/16	19/22	24/29	24/29	29/32

BT-150 in clear white glass

100	£25·50	29·00	32·00	37·00	43·00	57·00	*mx*
10	£ 2·80	3·20	3·50	4·10	4·70	6·40	
Each	£ 0·34	0·38	0·41	0·46	0·52	0·72	

BT-152 in amber glass

100	£37·00	38·00	44·00	50·00	59·00	88·00	*mx*
10	£ 4·10	4·20	4·90	5·60	6·60	9·80	
Each	£ 0·46	0·47	0·54	0·62	0·72	1·10	



BT-150
BT-152
BT-165

BT-165

BOTTLES, stoppered reagent, *Pyrex* glass, narrow neck with interchangeable ground glass stopper.

Capacity	60	100	250	500	1000 ml	
Neck size	19/17	19/17	24/29	24/29	40/38	
Std pack qty.	24	24	36	24	24	
Std. pack	£16·40	16·90	32·60	25·15	32·00	*jx*
Each	£ 0·78	0·82	1·06	1·20	1·55	

Capacity	2	5	10	20 litre	
Neck size	40/38	50/42	60/46	60/46	
Std. pack qty.	6	2	1	1	
Std. pack	£10·55	5·90	5·50	8·30	*jx*
Each	£ 1·90	3·10	—	—	

For reservoir bottles with standard joint neck see BW-655 in List No. sequence.

ANCILLARY EQUIPMENT

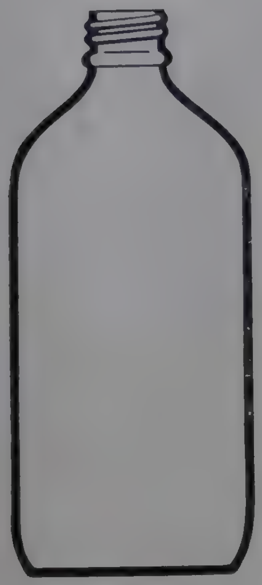
The following items will be found under the stated page headings.

Bottle brushes	see	**BRUSHES**
Bottle washers	see	**WASHING and DRYING**
Bottle shelves	see	**FURNITURE**

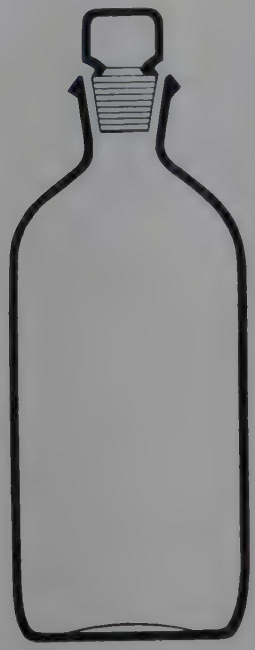
GENERAL PURPOSE BOTTLES

NARROW NECK, GLASS

(continued)



BT-172



BT-180
BT-182

BT-172

BOTTLES, screw neck, Winchester shape, clear white glass. The necks have moulded screw threads to BS 1918 and a choice of caps in various materials as listed below. **Supplied without caps.**

Capacity	30	60	125	250 ml	
Screw thread R3/	20	22	24	24	
Pack qty.	144	144	96	48	
Pack	**£2·80**	**2·90**	**2·90**	**1·80**	*cx*

Capacity	500	1000	2500 ml	
Screw thread	R3/28	R4/31	R4/31	
Pack qty.	24	12	12	
Pack	**£1·40**	**1·30**	**2·30**	*cx*

SCREW CAPS, suitable for above bottles.

For bottles 30 to 500 ml with R3/ threads.

BT-335 **Aluminium** ... ...
BT-340 **Bakelite** ... ...
BT-342 **Polypropylene** ... ...
BT-345 **Urea** ... ...

For prices and details see entries in List No. sequence.

For bottles 1000 and 2500 ml with R4/ threads.

BT-350 **Urea** ... ...
BT-355 **Urea** ... ...

For prices and details see entries in List No. sequence.

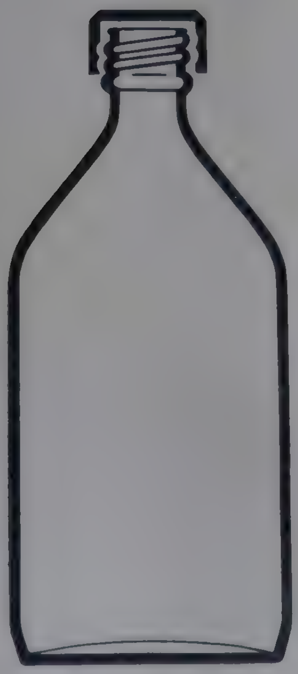
BOTTLES, glass stoppered, Winchester shape, with individually ground and fitted peg stoppers.

BT-180 in clear white glass.

BT-182 in amber glass.

Capacity	125	250	500	1000	2500 ml	
Pack qty.	96	48	24	12	12	
Pack	**£10·70**	**7·00**	**4·00**	**3·50**	**5·00**	*cx*
Each	**£ 0·20**	**0·23**	**0·25**	**0·35**	**0·48**	

CARRIERS FOR WINCHESTER BOTTLES
See BT-600 and BT-610 in List No. sequence.



BT-195

BT-195

BOTTLES, screw neck, clear white glass, **medical pattern** to BS 1679 Part 6. Supplied capped with polypropylene screw sealing cap in sealed pack.

Capacity	50	100	150	200	300	500 ml	
Neck dia.	22	22	22	28	28	28 mm	
Pack qty.	144	144	72	72	36	36	
Pack	**£5·00**	**5·60**	**3·10**	**3·70**	**2·25**	**3·10**	*cx*

BT-200

BT-200

BOTTLES, oil sample, clear white glass. Supplied corked.

Capacity	225	450 ml	
100	**£8·00**	**11·80**	*cx*
10	**£0·88**	**1·30**	
Each	**£0·16**	**0·20**	

GENERAL PURPOSE BOTTLES

When selecting please note the properties of plastics materials given under the page heading **PLASTICS**

WIDE NECK, PLASTICS

BT-205

BOTTLES, polythene, semi-wide neck, suitable for storage of oil samples, reagents or standard solutions. These robust bottles are fitted with polythene screw caps with deep seating seal.

Capacity	250	500	1000 ml	
Ten	**£1·55**	**2·00**	**2·90**	cx
Each	**£0·23**	**0·27**	**0·35**	

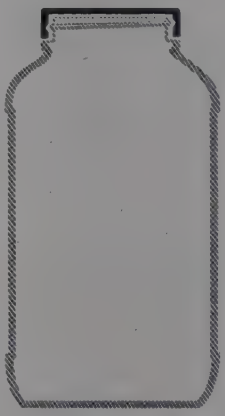
BT-205

BT-210

BOTTLES, polythene, wide neck, fitted with bakelite screw cap with liner. In packs of 10.

Capacity	60	125	250	500 ml	
Thread R3/	33	38	58	58	
10 packs	**£6·80**	**6·40**	**9·40**	**12·80**	cx
Pack	**£0·76**	**0·72**	**1·04**	**1·45**	

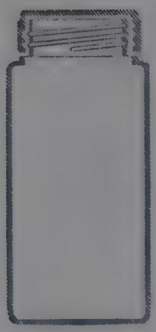
BT-340	**Caps, bakelite,** spare for BT-210.	For details see entries in List No. sequence.
BT-344	**Caps, polypropylene** for use with BT-210	


BT-210

BT-215

BOTTLES, polypropylene, wide neck, fitted with polypropylene screw cap. Can be sterilised in an autoclave up to 135°C.

Capacity	60	125	250	500	1000 ml	
100	**£9·00**	**10·00**	**22·00**	**27·00**	**40·00**	mx
10	**£1·00**	**1·30**	**2·60**	**3·50**	**4·80**	
Each	**£0·17**	**0·20**	**0·32**	**0·41**	**0·54**	


BT-215

BT-220

BOTTLES, polythene, extra wide neck, fitted with bakelite screw cap with liner.

Capacity	125	250	500	1000 ml	
Screw thread R3/	58	70	100	100	
100	**£9·00**	**11·80**	**24·50**	**29·00**	cx
10	**£0·98**	**1·30**	**2·70**	**3·20**	
Each	**£0·17**	**0·20**	**0·33**	**0·38**	

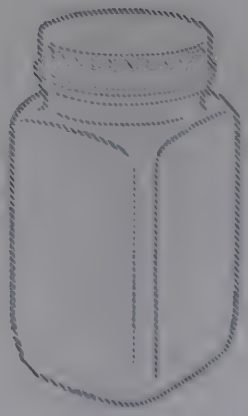
BT-340 **Screw caps,** spare for BT-220, see entry in List No. sequence.

BT-220

BT-225

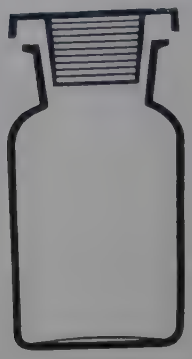
BOTTLES, rigid polythene, extra wide neck, square shape, fitted with rigid polythene screw cap.

Capacity	500	1000	2000 ml	
Ten	**£2·70**	**3·00**	**3·40**	cx
Each	**£0·33**	**0·36**	**0·40**	


BT-225

GENERAL PURPOSE BOTTLES

WIDE NECK, GLASS

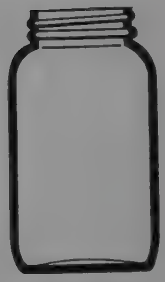


BT-250

BT-250

BOTTLES, glass-stoppered reagent, clear white glass, wide neck with individually ground glass stoppers.

Capacity	60	125	250	500	1000 ml	
36	**£9·00**	**10·00**	**13·00**	**14·60**	**19·00**	cx
12	**£3·20**	**4·00**	**4·60**	**5·10**	**6·60**	
Each	**£0·33**	**0·36**	**0·45**	**0·49**	**0·64**	



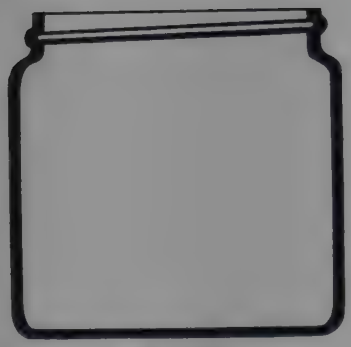
BT-260

BT-260

BOTTLES, wide screw neck, clear white glass. The necks of these bottles have moulded screw threads to BS 1918. **Supplied without caps.**

Capacity	15	30	60	125	175 ml	
Screw thread R3/	28	33	38	38	48	
Pack qty.	144	144	144	72	72	
Pack	**£2·70**	**3·00**	**3·20**	**2·20**	**2·80**	cx

Capacity	250	350	500	1000 ml	
Screw thread R3/	48	51	51	63	
Pack qty.	72	24	24	24	
Pack	**£2·90**	**1·30**	**1·40**	**2·50**	cx



BT-265

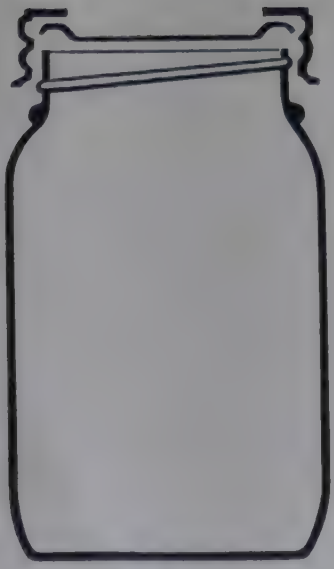
BT-265

BOTTLES, extra-wide screw neck, clear white glass. The necks of these bottles have moulded screw threads to BS 1918. **Supplied without caps.**

Capacity	15	30	60	125	250 ml	
Screw thread R3/	38	38	51	58	89	
Pack qty.	144	144	72	72	48	
Pack	**£2·60**	**2·80**	**1·75**	**2·20**	**2·40**	cx

SCREW CAPS, suitable for BT-260 and BT-265.

BT-340	**Bakelite**	For prices and details see entries in List No. sequence.
BT-344	**Polypropylene** ...	



BT-290

BT-290

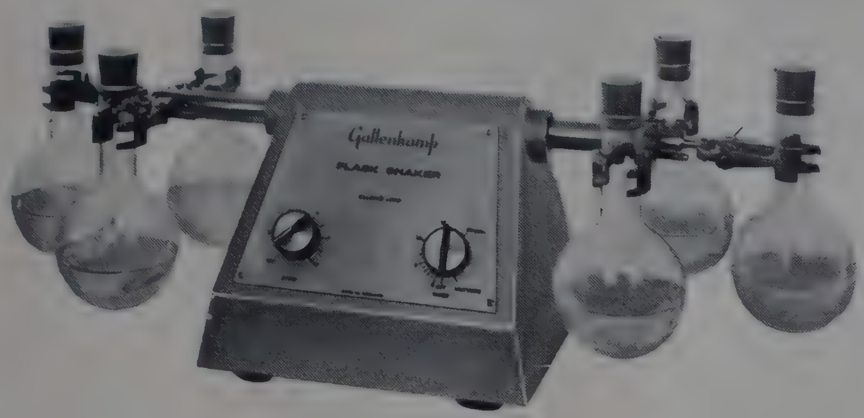
BOTTLES, Kilner, wide neck with screw sealing ring and expendable coated cap.

Capacity	500	1000	2000 ml	
Pack qty.	12	12	6	
10 packs	**£20·00**	**24·00**	**18·00**	cx
Pack	**£ 2·25**	**2·65**	**2·00**	

BT-292 **Caps,** coated metal, spare for above. In pack of 25.
10 packs **£8·60** Pack **£0·96** cx

Gallenkamp BOTTLE and FLASK SHAKER

For dissolving, dispensing, extracting and other applications



- **Positive grip clamps**
- **Speeds up to 800 oscillations/min**
- **Integral 0 to 20 minute timer**

Available for 220/240V and 110/120V 50/60 Hz single phase supplies.

See SD-110 in List No. sequence.

BOTTLE CAPS

R3 Threads to BS 1918

BT-335

BOTTLE CAPS, aluminium, with rubber liner, sterilisable. In packs of 25.

Thread R3	20	22	24	28 mm	
10 packs	£4·00	4·00	4·00	5·00	cx
Pack	£0·45	0·45	0·45	0·55	

BT-340

BOTTLE CAPS, bakelite, with liner. In packs of 25.

Thread R3	20	22	24	28	33 mm	
10 packs	£1·00	1·10	1·20	1·30	1·40	cx
Pack	£0·17	0·18	0·19	0·20	0·21	

Thread R3	38	48	51	58 mm	
10 packs	£1·80	2·60	2·70	3·00	cx
Pack	£0·25	0·32	0·33	0·36	

Thread R3	63	70	89	100 mm	
10 packs	£3·60	4·10	9·40	9·80	cx
Pack	£0·42	0·46	1·04	1·10	

BT-342

BOTTLE CAPS, polypropylene. With moulded internal lip which seals without the need for a separate insert. Can be autoclaved up to 135°C. In packs of 25.

Thread R3	20	22	24	28 mm	
10 packs	£1·00	1·20	1·30	1·30	cx
Pack	£0·17	0·19	0·20	0·20	

BT-344

BOTTLE CAPS, polypropylene. Can be autoclaved up to 135°C. In packs of 25.

Thread R3	33	38	48	51 mm	
10 packs	£7·00	7·20	7·20	7·60	cx
Pack	£0·78	0·80	0·80	0·84	

Thread R3	58	63	89 mm	
10 packs	£7·60	7·60	14·00	cx
Pack	£0·84	0·84	1·55	

BT-345

BOTTLE CAPS, urea, with conical polythene sealing insert. In packs of 25.

Thread R3	20	22	24	28 mm	
10 packs	£1·70	1·80	1·90	2·20	cx
Pack	£0·24	0·25	0·25	0·29	

BT-574

BOTTLE CAP, spraying, with R3/24 neck thread. For price see entry in List No. sequence.

R4 Threads to BS 1918

BT-350

BOTTLE CAPS, urea, with vinyl faced liner. In packs of 25.

Thread R4	20	24	31 mm	
10 packs	£2·70	2·90	4·00	cx
Pack	£0·33	0·35	0·45	

BT-355

BOTTLE CAPS, urea, with conical polythene sealing insert. Thread R4/31. In pack of 25.
10 packs £3·10 Pack £0·37 cx

STOPPERS

CORK	see	CV-010 et seq.
PLASTICS	see	SU-700 et seq.
RUBBER	see	SU-760 et seq.

For details and prices see entries in List No. sequence.

LABELLED REAGENT BOTTLES

Regd.

LABELS

All reagent bottles listed in this section are processed in our own factory. Two types of label are available:—

Enamel Labels are silk screen printed using vitreous enamels of the highest available chemical resistance. The legend and border are well defined in black enamel on a dense white tablet. Firing at a high temperature fuses the enamel to the surface of the glass.

Sandblast Labels. Clear glass letters and border stand out from the deeply sandblast background and remain fully legible even when wet.

STOPPERS

Most narrow neck reagent bottles are supplied fitted with interchangeable, hexagonal grip polypropylene stoppers. The remaining narrow neck bottles with titles of reagents for which polypropylene is unsuitable, also all wide neck bottles, are supplied with glass stoppers. The stoppers of indicator dropper bottles are of polythene and have integral teat droppers.

AVAILABLE TITLES

Any title can be inscribed on any suitable size of bottle but it is not practicable to stock all the possible combinations.

Labelled bottles are listed in three ranges.

I STOCK RANGE

Bottle size and title combinations which are in heavy demand and are normally available from stock.

2 LISTED TITLES RANGE

Bottle size and title combinations in smaller but regular demand, which are made to order.

3 SPECIAL TITLES RANGE

Bottles with titles to customers' special orders.

BLANK LABEL BOTTLES

A range of bottles in several sizes having white vitreous enamel writing tablets with black borders is included. These are intended for user inscription by means of wax pencil, paint, felt tip marker, etc.

STOCK TITLES

CODES A = Amber glass bottle G = Glass stoppered bottle.

250 ml REAGENT, narrow neck, enamel or sandblast label

No.	Code	Title
200		Acetic acid, dil.
202		,, ,, , glacial
204		Acetone
206		Ammonium acetate
208		,, carbonate
210		,, chloride
212		,, hydroxide, conc.
214		,, ,, , dil.
216		,, molybdate
218		,, oxalate
220	A	,, sulphide
222		Barium chloride
224	G	Benzene
226	G	Bromine water
228		Calcium chloride
230	GA	Carbon tetrachloride
232	GA	Chloroform
234	GA	Ether
236		Ethyl alcohol
238		Fehling's solution No. 1
240		,, ,, No. 2
242		Ferric chloride
244	G	Hydrochloric acid, conc.
246		Hydrochloric acid, dil.
248		Lead acetate
250		Lime water
252		Mercuric chloride
254		Methyl alcohol
256	GA	Nitric acid, conc.
258		,, ,, ,dil.
260		Potassium chromate
262		,, dichromate
264		,, ferricyanide
266		,, ferrocyanide
268		,, hydroxide
270		,, iodide
272		,, permanganate
274		,, thiocyanate
276	A	Silver nitrate
278		Sodium carbonate
280		,, hydroxide
282		,, phosphate
284		Stannous chloride
286	G	Sulphuric acid, conc.
288		,, ,, , dil.

500 ml REAGENT, narrow neck, enamel or sandblast label

No.	Code	Title
340		Acetic acid, dil.
342		,, ,, , glacial
344		Ammonium hydroxide, conc.
346		,, ,, , dil.
348		Barium chloride
350	G	Hydrochloric acid, conc.
352		,, ,, , dil.
354	GA	Nitric acid, conc.
356		,, ,, , dil.
358	A	Silver nitrate
360		Sodium hydroxide
362	G	Sulphuric acid, conc.
364		,, ,, , dil.

60 ml DROPPER, enamel label only

No.	Title
400	Litmus (pH 5·0—8·0)
402	Methyl orange (pH 2·9—4·6)
404	Methyl orange, screened (pH 2·9—4·6)
406	Phenolphthalein (pH 8·3—10·0)
408	Starch indicator
410	Universal indicator (pH 3·0—11·0)

AG LABELLED REAGENT BOTTLES

Regd.

STOCK RANGE

The bottles listed in this Section are normally available from stock with titles (see 'Stock Titles' list p. 76) already inscribed or with blank labels for user inscription.

NOTE: Applies to BT-400 and BT-406 only. Bottles will be clear or amber glass with stoppers of polythene, polypropylene or glass as appropriate to the titles. Quantity rates apply to orders for mixed or single titles.

BT-400
dropper

BT-400
reagent

BT-400

BOTTLES, AG, **enamel label,** glass, narrow neck, **stock range** with titles from appropriate sections of list on opposite page. With stopper.

Capacity	60	250	500 ml	
Bottle type	dropper	reagent	reagent	
Title Nos.	400/410	200/288	340/364	
Neck size	16/16	24/29	24/29	
Ten	**£5·80**	**4·90**	**6·40**	*ax*
Each	**£0·64**	**0·55**	**0·72**	

125 ml capacity with titles from stock list see BT-420.

COLOUR CODING STOPPERS

Polypropylene stoppers SU-710 and SU-712 which provide a choice of colours can be used as appropriate to colour code narrow neck reagent bottles.

For prices and details see entries in List No. sequence.

BT-402

BOTTLES, AG, **enamel label,** narrow neck with **blank label** and border, for user inscription. Clear glass with polypropylene stoppers.

Capacity	60	125	250	500 ml	
Bottle type	dropper	reagent	reagent	reagent	
Neck size	16/16	19/22	24/29	24/29	
Ten	**£5·80**	**5·00**	**4·90**	**6·40**	*ax*
Each	**£0·64**	**0·56**	**0·55**	**0·72**	

BT-404

BOTTLES, AG, **enamel label,** wide neck with **blank label** and border, for user inscription. Clear glass with ground glass stoppers.

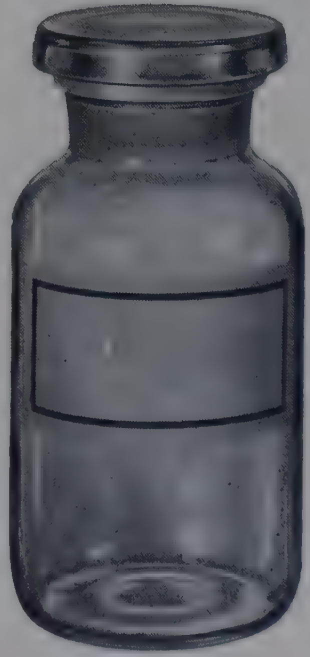
Capacity	125	250	500 ml	
Ten	**£5·20**	**5·30**	**7·00**	*ax*
Each	**£0·58**	**0·59**	**0·78**	

BT-406

BOTTLES, AG, **sandblast label,** narrow neck, glass, **stock range** with titles from appropriate sections of list on opposite page. With stopper. Neck size 24/29.

Capacity	250	500 ml	
Title Nos.	200/288	340/364	
Ten	**£5·20**	**7·00**	*ax*
Each	**£0·58**	**0·78**	

125 ml capacity with titles from stock list see BT-420.



BT-404

BT-406

Regd.

LABELLED REAGENT BOTTLES

OTHER LISTED TITLES

CODES A = Amber glass bottle. G = Glass stoppered bottle. D = Dropper bottle (enamel label only). W = Wide neck bottle.

No.	Code	Title
450		Acetic acid
452		„ „ , conc.
454	G	„ anhydride
456	G	Acetyl chloride
458		Alcohol
460		„ absolute
462		„ rectified spirit
464		Alizarin
466	GW	Aluminium, metal
468		Aluminon
470		Ammonia
472	GW	Ammonium acetate, cryst.
474	GW	„ chloride, cryst.
476		„ hydroxide
478		„ „ 0·880
480	GW	„ iodide, cryst.
482		„ nitrate
484		„ persulphate
486		„ phosphate
488		„ sulphate
490		„ thiocyanate
492	G	Amyl acetate
494		„ alcohol
496	GW	Asbestos
506		Barfoed's reagent
508		Barium carbonate
510	D	„ diphenylamine p-sulphonate
512		Barium hydroxide
514		„ nitrate
516		Benedict's reagent
518		1—Benzoin oxime
520		Boric acid
522	GW	Borax
524	G	Bromine
526	D	Bromocresol green (pH 3·6—5·2)
528	D	Bromocresol purple (pH 5·2—6·8)
530	D	Bromophenol blue (pH 2·8—4·6)
532	D	Bromothymol blue (pH 6·0—7·6)
534	G	Butyl acetate
536		„ alcohol
546		Cacotheline
548	GW	Calcium carbonate
550	GW	„ fluoride
552		„ hydroxide
554		„ sulphate, satd.
556	GA	Carbon disulphide
558	GW	Charcoal
560	GA	Chlorine water
562	G	Chromic acid/sulphuric acid
564	GW	Citric acid, cryst.
566		Cobalt nitrate
568		Copper acetate
570	GW	„ oxide
572		„ sulphate
574	GW	Copper turnings
584	GW	Devarda's alloy
586		Dimethyl glyoxime
588	D	„ yellow (pH 2·8—4·6)
590		2 : 4 Dinitrophenylhydrazine
592		Diphenylamine
594		Distilled water
604	G	Ethyl acetate
606	D	Eriochrome
616		Ferrous ammonium sulphate
618	GW	Ferrous sulphate
620	GW	Filter paper pulp
622		Formaldehyde
624		Fuchsin
626	GW	Fusion mixture
636	GW	Glass wool
638	GW	Glucose
640		Glycerol
650		Hydrochloric acid
652	A	Hydrogen peroxide
654		Hydroxylamine
656		8-Hydroxyquinoline
666		Iodine
668		Iodine in potassium iodide
670	GW	Iron wire
672	GW	Iron filings
674		Isopropyl alcohol
684	GW	Lead dioxide
686		„ nitrate
688	GW	Litmus papers
698	GW	Magnesia mixture
700		Magnesium nitrate
702		„ sulphate
704		Magneson
706	GW	Manganese dioxide
708		Manganous chloride
710	D	Methyl red (pH 4·2—6·3)
712		Methylated spirit
714	D	Methylene blue
716		Millon's reagent
718	D	Murexide
728		2–Naphthol
730	A	Nessler's reagent
732	A	Nitric acid
734	GA	„ „ , fuming
736		1–Nitroso 2–Naphthol
746		Oxalic acid
748	GW	„ „ , cryst.
758	GA	Perchloric acid
760	G	Petroleum ether
762	G	Petroleum ether 40/60°
764	G	„ „ 60/80°
766	G	„ „ 80/100°
768	G	„ „ 100/120°
770	D	Phenol red (pH 6·8—8·4)
772	G	Phosphoric acid
774		Picric acid
776		Potassium aluminium sulphate
778		„ bromide
780		„ chloride
782		„ cyanide
784		Pyridine
786	A	Pyrogallol
796		Schiff's reagent
798	GW	Silica
800	GW	„ gel
802	GW	Soda lime
804	GW	Sodium, metal
806		„ acetate
808	GW	„ „ , cryst.
810		„ bicarbonate
812		„ bismuthate
814	GW	„ carbonate, anhydrous
816		Sodium chloride
818		„ cobaltinitrite
820		„ diaminoethane tetracetate
822		Sodium fluoride
824		„ hydrogen phosphate
826		„ „ tartrate
828		„ hydroxide, dil.
830	A	„ hypochlorite
832		„ nitrate
834	GW	„ nitrite, cryst.
836	GW	„ nitroprusside
838	GW	„ peroxide
840		„ sulphate
842	GW	„ „ anhydrous
844		„ sulphide
846		„ thiosulphate
848	GW	Starch iodide papers
850	GW	Sucrose
852	GW	Sulphur
854		Sulphuric acid
856		Sulphurous acid
866	GW	Tartaric acid, cryst.
868	GW	Test papers
870	D	Thymolphthalein (pH 9·3—10·5)
872	GW	Tin, metal
874	G	Toluene
876	GA	Trichlorethylene
878		Triethanolamine
888	G	Xylene
898	GW	Zinc, dust
900	GW	„ , granulated
902	GW	„ „ arsenic free
904		„ uranyl acetate
906		Zirconium nitrate

LABELLED REAGENT BOTTLES

Regd.

LISTED TITLES RANGE

The bottles listed in this Section are inscribed to customers' orders with titles (see 'Other Listed Titles' p. 78) maintained at our factory for this purpose.

It should be noted that several titles in this list are synonyms or minor variants of titles listed in the stock range on page 76. In such cases the more systematic or logical variant in greatest general demand is listed in the stock range and, due to quantity production, is priced more economically.

BT-420

BOTTLES, (AG), enamel label, narrow neck with titles from list on opposite page. With stopper.

Capacity	60	120	125	250	500 ml	
Bottle type	dropper	dropper	reagent	reagent	reagent	
Ten	**£7·10**	**7·30**	**6·00**	**6·30**	**7·70**	*axN*
Each	**£0·80**	**0·82**	**0·68**	**0·70**	**0·86**	

BT-425

BOTTLES, (AG), enamel label, wide neck, with titles code W from list on opposite page. With glass stopper.

Capacity	125	250	500 ml	
Ten	**£6·20**	**6·70**	**8·30**	*axN*
Each	**£0·70**	**0·74**	**0·92**	

NOTE:

1. **Narrow neck reagent bottles** will be supplied with polypropylene or glass stoppers as appropriate to reagent title.
2. **Dropper bottles** are available only with titles on page 78 coded D and will be supplied with polythene stopper having integral teat dropper.
3. **BT-420 and BT-430.** Prices for the 125 ml and 500 ml capacities apply also to titles shown in the reagent bottle lists on page 76 where these are not included as stock titles under BT-400 and BT-406 respectively.

BT-430

BOTTLES, (AG), sandblast label, narrow neck, with titles from list on opposite page. With stopper.

Capacity	125	250	500 ml	
Ten	**£5·80**	**6·10**	**7·50**	*axN*
Each	**£0·64**	**0·68**	**0·84**	

BT-435

BOTTLES, (AG), sandblast label wide neck with titles code W from list on opposite page. With glass stopper.

Capacity	125	250	500 ml	
Ten	**£6·00**	**6·50**	**8·10**	*axN*
Each	**£0·68**	**0·72**	**0·90**	

SPECIAL TITLES RANGE

The bottles listed in this Section are inscribed to customers' orders with titles not included in our Stock or Listed Titles ranges. To meet this requirement for special titles, stencils are made to customers' instructions and are retained at our factory for **two years.** During this period, a customer may place a repeat order at a lower price provided that the order is marked **'special stencil previously made on (date)'** and preferably identified with the appropriate List No. in the BT-420 to BT-435 series, at which prices the order will then be invoiced.

BT-450

BOTTLES, (AG), enamel label, narrow neck, with special titles not included in our lists. With stopper.

Capacity	60	120	125	250	500 ml	
Bottle type	dropper	dropper	reagent	reagent	reagent	
25	**£23·00**	**23·50**	**20·00**	**21·50**	**23·50**	*axN*
10	**£10·00**	**10·40**	**9·50**	**10·00**	**11·00**	
5	**£ 6·00**	**6·20**	**5·60**	**6·00**	**6·50**	
Each	**£ 2·40**	**2·50**	**2·30**	**2·40**	**2·45**	

BT-455

BOTTLES, (AG), as BT-450 but **wide neck,** with ground glass stoppers.

Capacity	125	250	500 ml	
25	**£20·50**	**22·50**	**25·00**	*axN*
10	**£ 9·70**	**10·40**	**11·60**	
5	**£ 5·70**	**6·20**	**6·80**	
Each	**£ 2·40**	**2·60**	**2·75**	

NOTE: (i) All bottles are supplied in clear glass.

(ii) Narrow neck reagent bottles are supplied with polypropylene stoppers.

(iii) Dropper bottles are supplied with polythene stoppers having integral teat dropper.

Orders for bottles other than as specified above will be considered.

BT-460

BOTTLES, (AG), sandblast label, narrow neck, with special titles not included in our lists. With stopper.

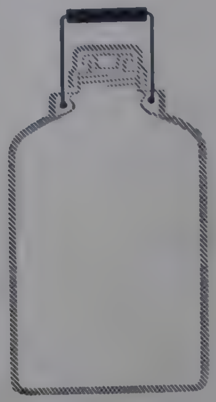
Capacity	125	250	500 ml	
25	**£18·00**	**20·00**	**21·50**	*axN*
10	**£ 8·00**	**8·40**	**9·20**	
5	**£ 5·00**	**5·25**	**5·70**	
Each	**£ 1·60**	**1·65**	**1·75**	

BT-465

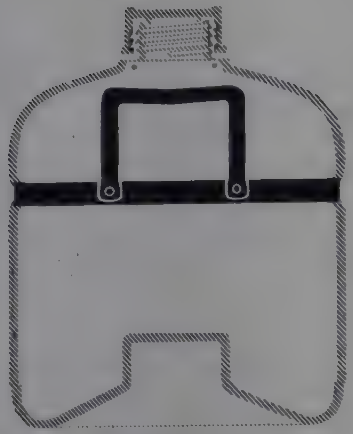
BOTTLES, (AG), as BT-460 but **wide neck,** with ground glass stoppers.

Capacity	125	250	500 ml	
25	**£18·50**	**21·00**	**23·00**	*axN*
10	**£ 8·20**	**8·80**	**9·80**	
5	**£ 5·10**	**5·45**	**6·00**	
Each	**£ 1·70**	**1·85**	**2·05**	

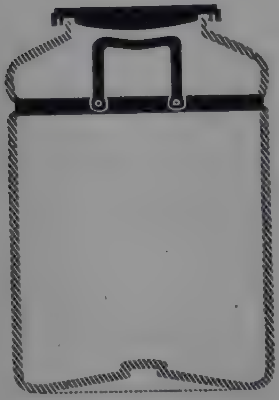
QUANTITY RATES for bottles BT-420 to BT-465 apply only to quantities of one title.



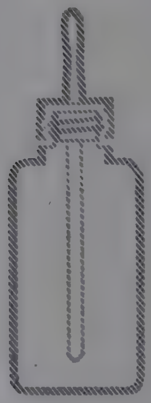
BT-500



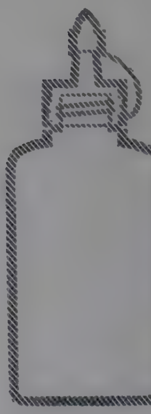
BT-510



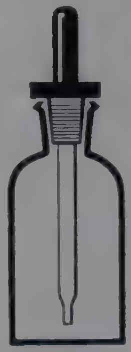
BT-515



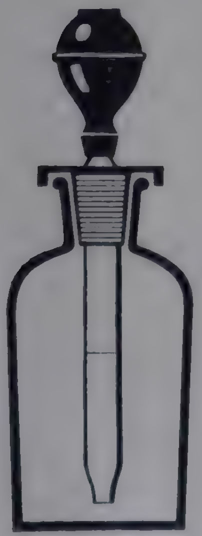
BT-540



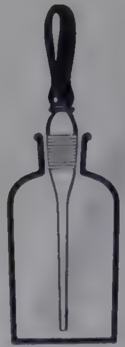
BT-545



BT-550



BT-552



BT-555

LARGE CAPACITY PLASTICS BOTTLES

BT-500

BOTTLES, rigid polythene, with internal leak proof closure protected by screw cap. Neck dia. 63 mm.

Capacity	4·5	9	22 litres	
Each	**£0·85**	**1·15**	**2·70**	*cx*

BT-510

BOTTLES, thick polythene, with screw cap and lifting handles.

Capacity	15	25	50 litres	
Diameter	32	32	38 cm	
Each	**£4·60**	**7·50**	**10·50**	*mx*

BT-515

BOTTLES, rigid polythene, with 18 cm dia. wide mouth for easy filling, closed by a tight push-on cap. With lifting handles.

Capacity	20	25	50 litres	
Diameter	32	32	38 cm	
Each	**£7·20**	**7·50**	**10·50**	*mx*

CC-980

CARBOY/BOTTLE TROLLEY suitable for larger sizes of BT-510 and BT-515. For details see entry in List No. sequence.

BOTTLES, DROPPING & DISPENSING

BT-540

BOTTLES, dropping, polythene with screw cap, vinyl teat and polythene pipette.

Capacity	60	125 ml	
Ten	**£2·60**	**2·90**	*mx*
Each	**£0·32**	**0·35**	

BT-545

BOTTLES, dispensing, polythene with screw cap fitted with elongated spout and closure.

Capacity	60	125	250	500 ml	
Ten	**£0·85**	**0·90**	**1·80**	**2·30**	*mx*
Each	**£0·16**	**0·16**	**0·25**	**0·30**	

BT-550

BOTTLES, dropping, glass, with 16/16 interchangeable plastics stopper, vinyl teat and glass pipette.

Capacity	30	60	125 ml	
12	**£2·75**	**2·90**	**3·30**	*mx*
Each	**£0·29**	**0·31**	**0·34**	

BT-552

BOTTLES, dispensing, glass with 24/20 interchangeable plastics stopper, vinyl bulb and graduated glass pipette.

Capacity	250	500 ml	
Pipette graduated at	5	5 & 10 ml	
Six	**£2·70**	**2·94**	*mx*
Each	**£0·49**	**0·53**	

BT-555

BOTTLES, (AG), **dropping,** glass, with ground-in pipette stopper and rubber teat.

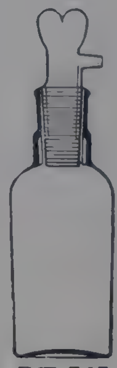
Capacity	30	60	125 ml	
Ten	**£3·90**	**4·10**	**5·00**	*ax*
Each	**£0·45**	**0·46**	**0·55**	

BOTTLES, DROPPING AND DISPENSING
(continued)

***BT-565**

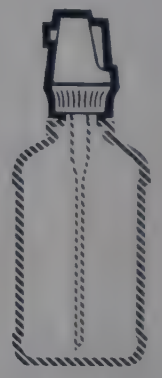
BOTTLES, dropping, TK pattern, glass, with ground-in slotted stopper.

Capacity	30	60	100 ml	
36	**£7·00**	**7·20**	**7·60**	*cx*
12	**£2·45**	**2·50**	**2·70**	
Each	**£0·27**	**0·28**	**0·29**	


BT-565

BT-574

BOTTLE CAP, spraying, press button pattern which delivers liquid as a finely atomised spray. The liquid contacts only polythene and stainless steel. With 11 cm polythene dip-tube and R3/24 neck thread which fits bottle BT-172 ... Ten **£1·40** Each **£0·21** *cx*


BT-574 with bottle

BT-580

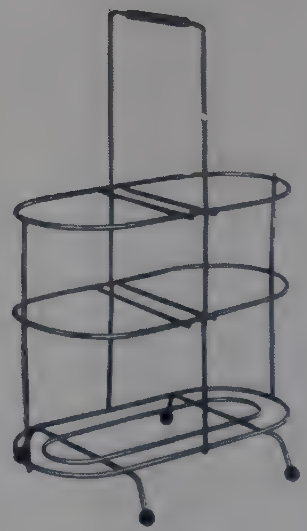
BOTTLE CAP, dispensing, polythene bellows pattern, delivers approx. 30 ml of liquid per stroke. The tapered stopper fits bottles with neck internal diameters from 14 to 20 mm. With 25 cm polythene dip tube. Each **£0·55** *cx*

BT-580 with bottle

BOTTLE CARRIERS AND DRIP TRAYS

BT-600

BOTTLE CARRIER, polythene covered strong steel rod. Suitable for 2 Winchester bottles but will accept most types of bottle up to 13·7 cm dia. Overall height 47 cm ... ... Ten **£17·50** Each **£1·95** *cx*


BT-600

BT-610

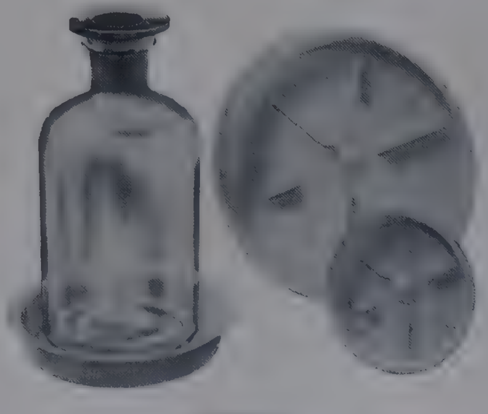
BOTTLE CARRIER, polythene, to take Winchester series bottles 2·5 litre size, liquid tight, with carrying handle, pivoted for easy pouring. This carrier forms a very convenient means of carrying and handling Winchester bottles in safety ... ... Each **£3·75** *mx*

BT-610

***BT-640**

BOTTLE TRAYS, polypropylene, to take single bottles. The bottle stands on raised ribs inside the tray which prevents drips damaging the bench.

Max. bottle dia.	7	9·5	13	15 cm	
Ten	**£1·00**	**1·80**	**3·00**	**4·00**	*mx*
Each	**£0·17**	**0·25**	**0·36**	**0·45**	


BT-640

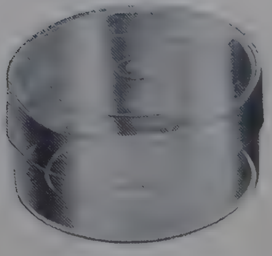
BENCH PROTECTION

AR-470/472	Asbestos Millboard
CM-770/775	Wax Polish
PB-990/991	Absorbent Paper

For details and prices see entries in List No. sequence.

BOXES

When selecting please note the properties of plastics materials given under the page heading **PLASTICS.**



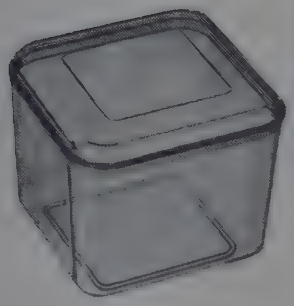
BT-820

BT-820

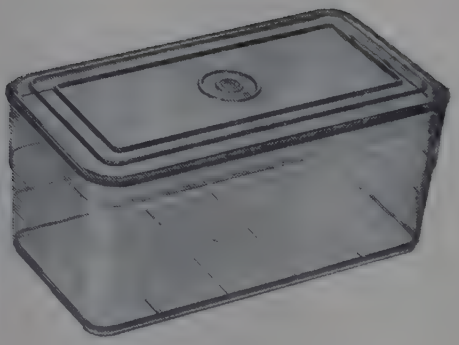
MOUNTING BOXES, clear polystyrene, circular with close fitting lid. For mounting entomological specimens if a cork bottom is used. In packs of 10.

Diameter	50	60 mm	
Depth	25	22 mm	
10 packs	**£3·00**	**4·00**	*cx*
Pack	**£0·36**	**0·45**	

Cork sheet—see CV-050 in List No. sequence.



BT-840



BT-842

BT-840

BOX, clear polystyrene, squat square shape, with internal fitting lid. Nominal dimensions 10×10×8 cm deep ... ... Ten **£1·80** Each **£0·25** *cx*

BT-842

BOX, clear polystyrene, as BT-840, but rectangular shape. Nominal dimensions 19×11×8 cm deep.
Ten **£2·60** Each **£0·32** *cx*

BT-850

BOX, polythene, rectangular shape with press-on sealing lid. Nominal dimensions 21×11×6·5 cm deep.
Ten **£4·40** Each **£0·49** *cx*

BT-850
BT-852
BT-860

BT-852

BOX, polythene, as BT-850 but nominal dimensions 21×14×7 cm deep.
Ten **£5·20** Each **£0·58** *cx*

BT-860

BOX, polypropylene, rectangular shape with loose fitting lid. Suitable for use as an instrument tray. Nominal internal dimensions 20×7×5 cm deep.
Ten **£4·20** Each **£0·47** *cx*

BT-862

BOX, polypropylene, as BT-860 but with nominal internal dimensions 20 × 15 × 5 cm deep.
Ten **£7·20** Each **£0·80** *cx*

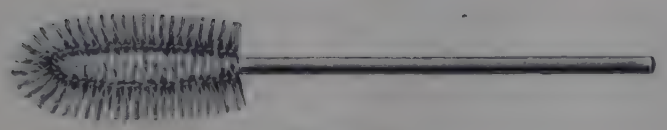
DISH, polypropylene, matching above boxes see DM-270 in List No. sequence.

BT-862

BOXES, glass top, specimen see BIOLOGICAL SCIENCES

BOXES, sterilising see STERILISING EQUIPMENT

BRUSHES

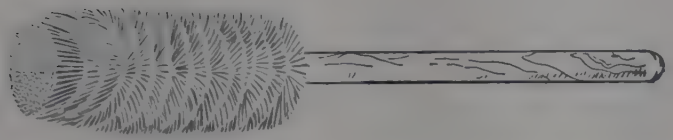


BU-430

BU-430

BRUSH, beaker, with bristles 15 mm long forming a head 15 cm long × 7 cm diameter at widest part, on hardwood handle. Overall length 40 cm.

Ten **£1·30** Each **£0·20** cx

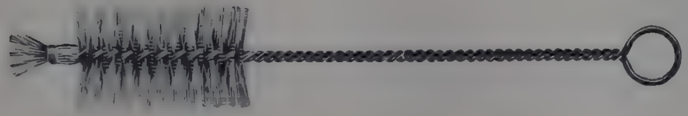


BU-434

BU-434

BRUSH, beaker, black hair with fan end, 15×7 cm, on hardwood handle. Overall length 40 cm.

Ten **£11·20** Each **£1·25** cx



BU-440 BU-442

BU-440

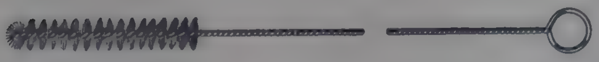
BRUSHES, bottle, white fibre on galvanised wire. In packs of 10.

Size No.	1	2	3	4	5	
Length of head	5	6	7·5	10	15 cm	
Dia. of head	4	4·5	5	6	7 cm	
Overall length	25	30	35	40	45 cm	
10 packs	**£4·80**	**6·40**	**6·80**	**7·60**	**9·00**	cx
Pack	**£0·53**	**0·72**	**0·76**	**0·84**	**1·00**	

BU-442

BRUSHES, bottle, white nylon on galvanised wire.

Size No.	1	2	3	4	5	
Length of head	5	6	7·5	10	15 cm	
Dia. of head	4	4·5	5	6	7 cm	
Overall length	25	30	35	40	45 cm	
Ten	**£0·60**	**0·65**	**0·80**	**1·00**	**1·40**	cx
Each	**£0·14**	**0·14**	**0·15**	**0·17**	**0·21**	

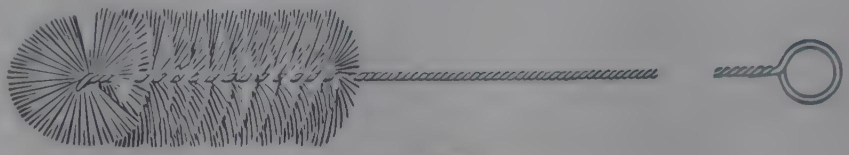


BU-460

BU-460

BRUSHES, burette, stiff white bristle on galvanised wire. In packs of 10.

Suitable for burette capacity	10	25	50	100 cm³	
Dia.	13	16	19	25 mm	
Overall length	50	60	75	90 cm	
10 packs	**£4·80**	**5·20**	**6·00**	**7·60**	cx
Pack	**£0·53**	**0·58**	**0·66**	**0·84**	

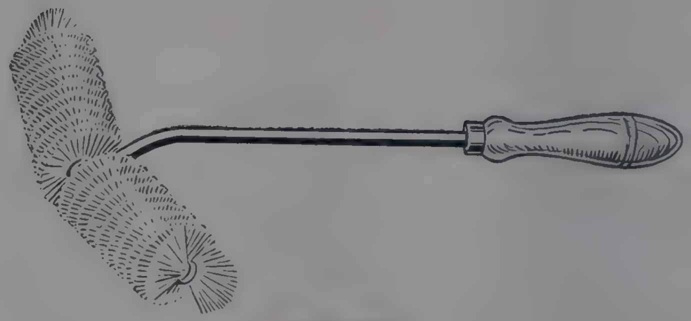


BU-480

BU-480

BRUSHES, cylinder, stiff white nylon, fan shaped end on strong galvanised wire.

Length of head	12	14 cm	
Dia. of head	6	7 cm	
Overall length	65	65 cm	
Ten	**£2·00**	**2·30**	cx
Each	**£0·27**	**0·30**	

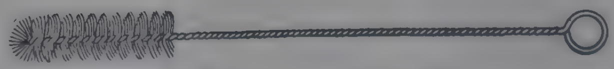


BU-520

BU-520

BRUSHES, flask, stiff white nylon, on galvanised wire with curved head, hinged joint and hardwood handle.

Length of head	10	17 cm	
Dia. of head	5	5 cm	
Suitable for flasks	1 to 3	5 litres	
Flask neck min. dia.	3	4·5 cm	
Ten	**£2·30**	**2·90**	cx
Each	**£0·30**	**0·35**	



BU-550 BU-552

BU-550

BRUSHES, test tube, white bristle with fan shaped end on galvanised wire. In packs of 10.

For test tubes	10 to 12	16 to 25 mm	
10 packs	**£2·30**	**3·00**	cx
Pack	**£0·30**	**0·36**	

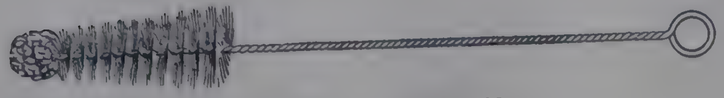
BU-552

BRUSHES, test tube, white nylon with fan shaped end on galvanised wire. In packs of 10.

For test tubes	10 to 12	16 to 25 mm	
10 packs	**£2·80**	**3·60**	cx
Pack	**£0·34**	**0·42**	

BRUSHES

(continued)



BU-560 BU-562

BU-560

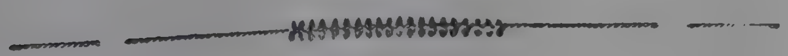
BRUSHES, test tube, white bristle with cotton yarn tip on galvanised wire. In packs of 10.

For test tubes	12 to 16	19 to 25 mm	
10 packs	**£2·80**	**3·80**	*cx*
Pack	**£0·34**	**0·44**	

BU-562

BRUSHES, test tube, white nylon with cotton yarn tip on galvanised wire. In packs of 10.

For test tubes	12 to 16	19 to 25 mm	
10 packs	**£3·80**	**4·40**	*cx*
Pack	**£0·44**	**0·49**	

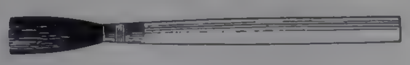


BU-580

BU-580

BRUSHES, tube, stiff white nylon set into centre of galvanised wire for cleaning tubes open at both ends. In packs of 10.

Dia. Overall length	3 40	6 40	12 mm 60 cm	
10 packs	**£4·80**	**4·80**	**4·80**	*cx*
Pack	**£0·53**	**0·53**	**0·53**	

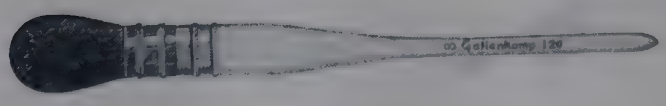


BU-600

BU-600

BRUSHES, round form, soft hair, in quill holders. In packs of 10.

Size	Small	Medium	Large	
10 packs	**£5·40**	**7·40**	**8·40**	*cx*
Pack	**£0·60**	**0·82**	**0·94**	

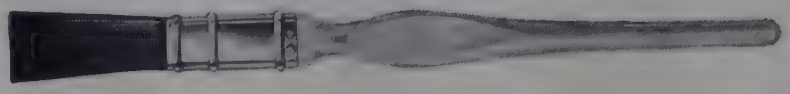


BU-610

BU-610

BRUSHES, round form, mop or dabber. Soft hair securely mounted in wooden handle.

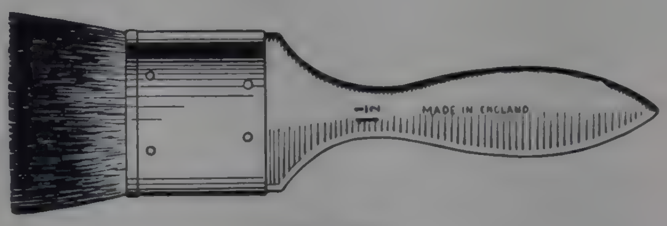
Size No. Dia. approx.	2 6	4 9	8 15 mm	
Ten	**£4·60**	**5·80**	**11·10**	*cx*
Each	**£0·51**	**0·64**	**1·25**	



BU-615

BU-615

BRUSH, flat form, bristle, 12 mm wide for cleaning or dusting in confined spaces. In metal mount on wooden handle ... ... Ten **£2·40** Each **£0·30** *cx*

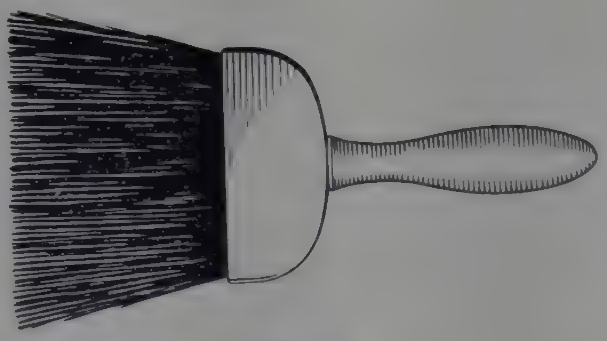


BU-620

BU-620

BRUSHES, flat form, soft hair, in metal mount on wooden handle.

Width	2·5	4	5 cm	
Ten	**£5·00**	**6·80**	**8·80**	*cx*
Each	**£0·55**	**0·76**	**0·98**	



BU-640

BU-640

BRUSH, flat form, dusting, 10 cm long, in wooden handle ... ... Ten **£5·60** Each **£0·62** *cx*

BU-680

BU-680

BRUSH, cleaning, polythene, set into polystyrene handle. Overall length 26 cm.
Ten **£1·60** Each **£0·23** *cx*

BUCKETS

BV-435

BUCKET, polypropylene, with handle but without pouring spout. Capacity 9 litres, dia. 24 cm, depth 24 cm. Each **£0·80** *cx*

BV-440

BUCKET, rigid polythene, with pouring spout and polythene covered steel handle. Capacity 10 litres, graduated on inside of bucket, dia. 29 cm, depth 29 cm. Each **£2·20** *cx*

BV-445

BUCKET, polythene, with pouring spout and strong wire handle with hand grip. Capacity 14 litres, dia. 31 cm, depth 25 cm ... ... Each **£0·90** *cx*

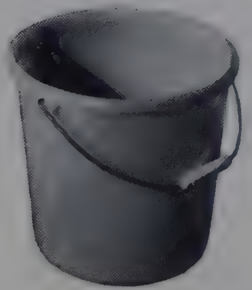
***BV-470**

BUCKET, stainless steel, seamless, with easy-pour rim and handle. Capacity 12 litres, dia. 30 cm, depth 26 cm. Each **£6·50** *cx*

FF-460

FIRE BUCKET. For details and price see entry in List No. sequence.

BUCKETS, centrifuge	see	CENTRIFUGES
BUFFER POWDERS	see	ELECTROCHEMICAL ANALYSIS
BULBS, absorption	see	ABSORPTION
BULBS, rubber	see	RUBBER SUNDRIES
BUNSEN BURNERS	see	BURNERS



BV-435

BV-440

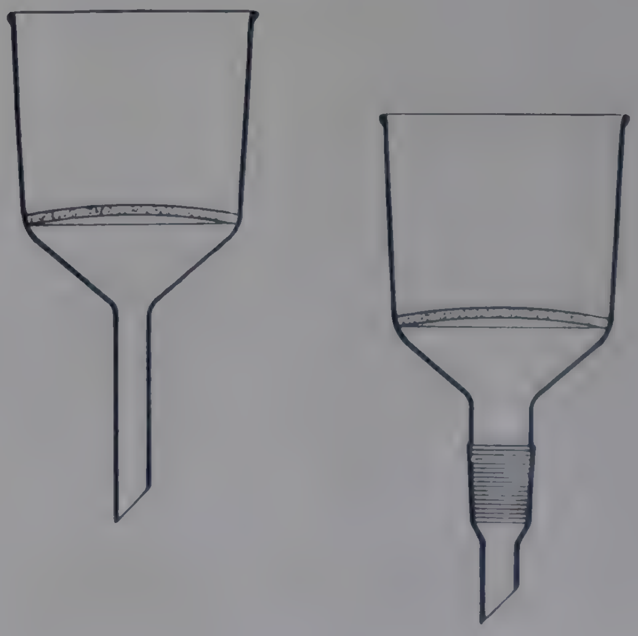
BV-445

BV-470

SINTAGLASS BUCHNER FUNNELS

Manufactured in our own factory under accurately controlled conditions.

- **Non-friable sintered plates made from borosilicate glass**
- **Porosities controlled to well within requirements of BS 1752**
- **Excellent uniformity of pore size**
- **Range of maximum pore diameters from 1 to 250 μm**
- **Porosities colour coded for easy identification**
- **Funnel capacities from 140 to 700 ml**

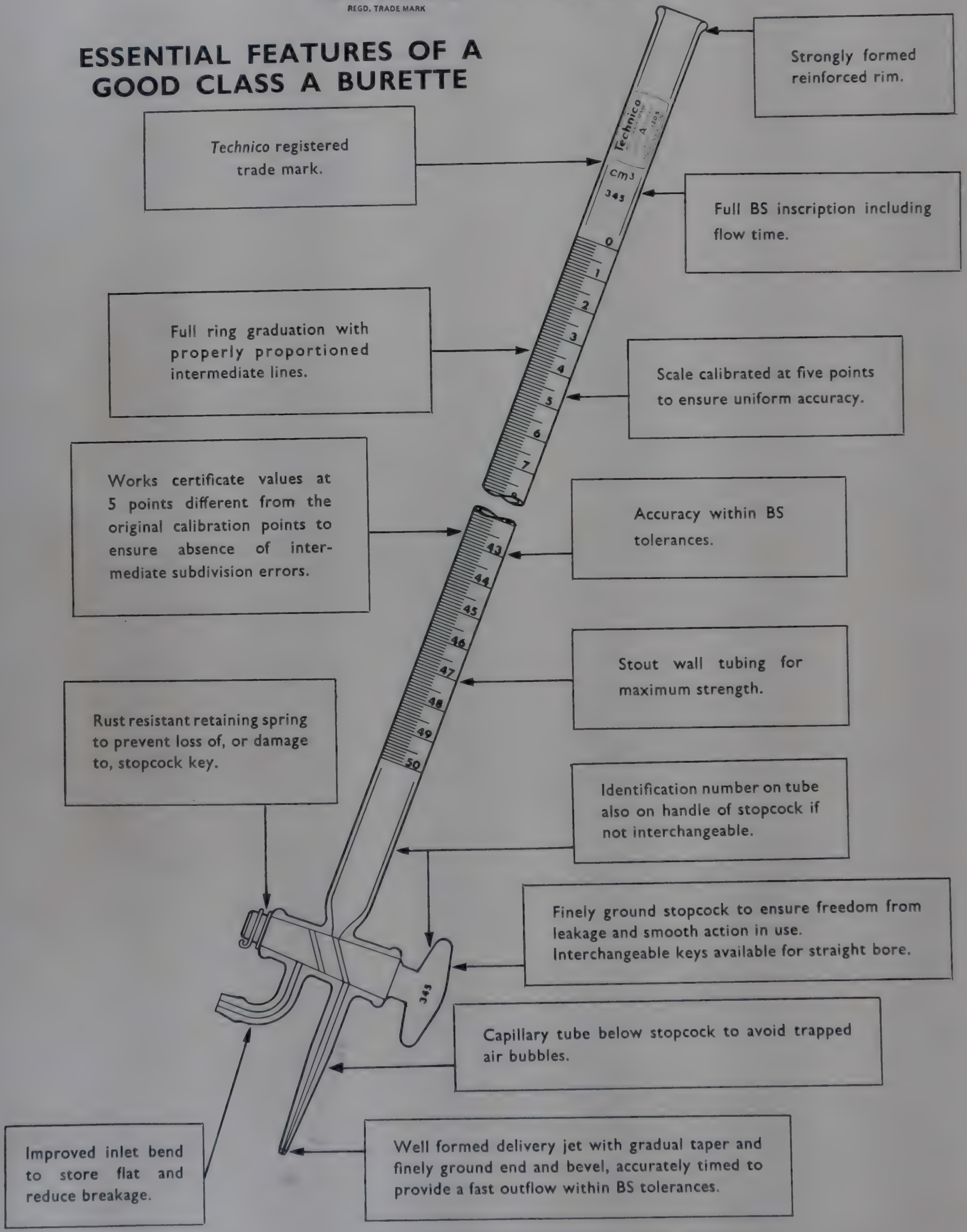


For details and prices see FM-631 et seq. in List No. sequence.

Technico BURETTES

REGD. TRADE MARK

ESSENTIAL FEATURES OF A GOOD CLASS A BURETTE



Strongly formed reinforced rim.

Technico registered trade mark.

Full BS inscription including flow time.

Full ring graduation with properly proportioned intermediate lines.

Scale calibrated at five points to ensure uniform accuracy.

Works certificate values at 5 points different from the original calibration points to ensure absence of intermediate subdivision errors.

Accuracy within BS tolerances.

Stout wall tubing for maximum strength.

Rust resistant retaining spring to prevent loss of, or damage to, stopcock key.

Identification number on tube also on handle of stopcock if not interchangeable.

Finely ground stopcock to ensure freedom from leakage and smooth action in use. Interchangeable keys available for straight bore.

Capillary tube below stopcock to avoid trapped air bubbles.

Improved inlet bend to store flat and reduce breakage.

Well formed delivery jet with gradual taper and finely ground end and bevel, accurately timed to provide a fast outflow within BS tolerances.

When ordering specify *Technico* Volumetric Glassware.

Technico BURETTES

REGD. TRADE MARK

With permanent graduations and inscriptions in amber stain

- **General design, tolerance and performance based on BS 846**
- **Straight bore, straight bore interchangeable and double oblique bore stopcocks**
- **Permanent graduations**
- **Works certified models available**

Useful information on burettes will be found on pages headed VOLUMETRIC GLASSWARE.

BURETTES WITHOUT STOPCOCK

BW-044

BURETTES, *Technico,* **Class B,** with nipple end, for use with pinchcock.

To deliver	25	50 cm^3	
Subdivided in	0·1	0·1 cm^3	
Ten	**£8·00**	**9·00**	*ax*
Each	**£0·90**	**1·00**	

BW-055

BURETTE PINCHCOCK, *Gallenkamp,* glass, with integral jet and length of silicone rubber tubing for connecting to a burette. Controlled delivery is obtained simply by squeezing the tubing at the ball of the pinchcock.
In pack of 5 ... 10 packs **£11·60** Pack **£1·30** *bx*

BURETTES WITH PTFE STOPCOCK

BW-064

BURETTES, *Technico,* **Class B,** with straight bore Ptfe key. Requires no lubrication.

To deliver	5	10	25	50 cm^3	
Subdivided in	0·05	0·02	0·1	0·1 cm^3	
Each	**£2·05**	**2·35**	**2·15**	**2·15**	*ax*

BURETTES WITH STRAIGHT BORE STOPCOCK

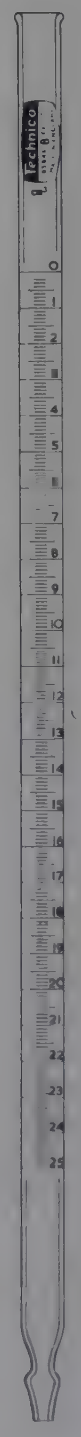
BW-084

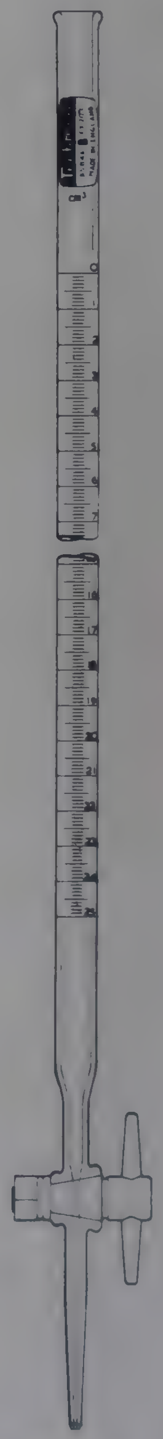
BURETTES, *Technico,* **Class B,** with straight bore stopcock. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

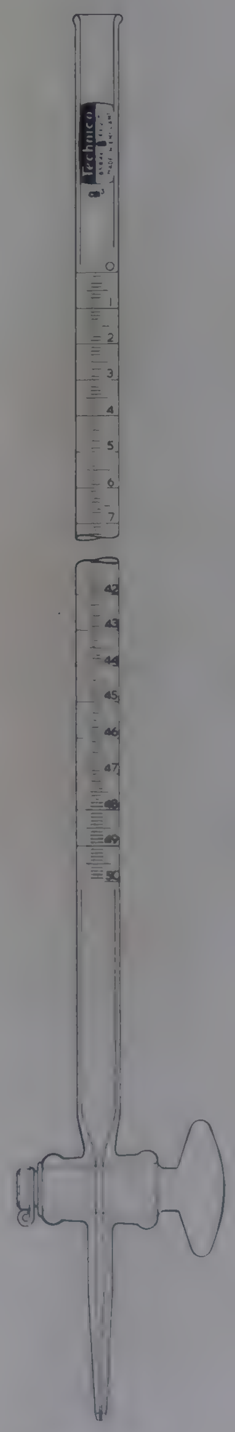
To deliver	1*	2*	5*	10	10* cm^3	
Subdivided in	0·01	0·02	0·05	0·1	0·02 cm^3	
Ten	**£13·60**	**14·00**	**14·40**	**9·80**	**17·50**	*ax*
Each	**£ 1·50**	**1·55**	**1·60**	**1·10**	**1·95**	

To deliver	25	25	50	100 cm^3	
Subdivided in	0·1	0·05	0·1	0·2 cm^3	
Ten	**£12·40**	**17·00**	**13·20**	**15·00**	*ax*
Each	**£ 1·40**	**1·90**	**1·50**	**1·70**	

ST-650 Spare retaining springs. For price see entry in List No. sequence.


BW-044


BW-064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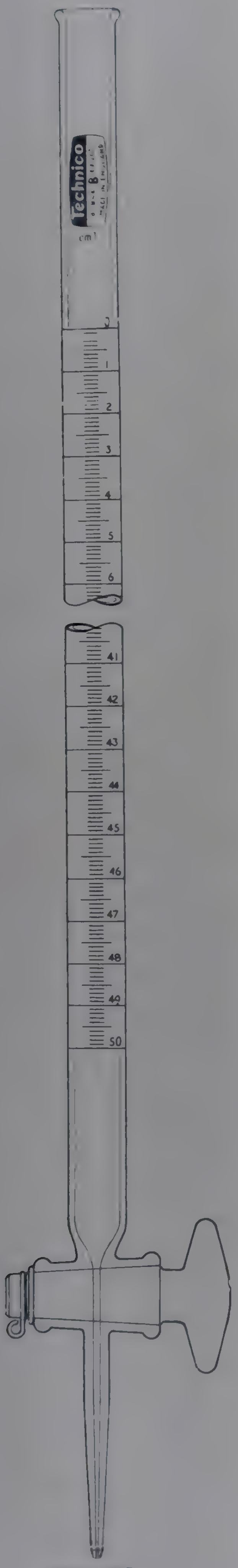
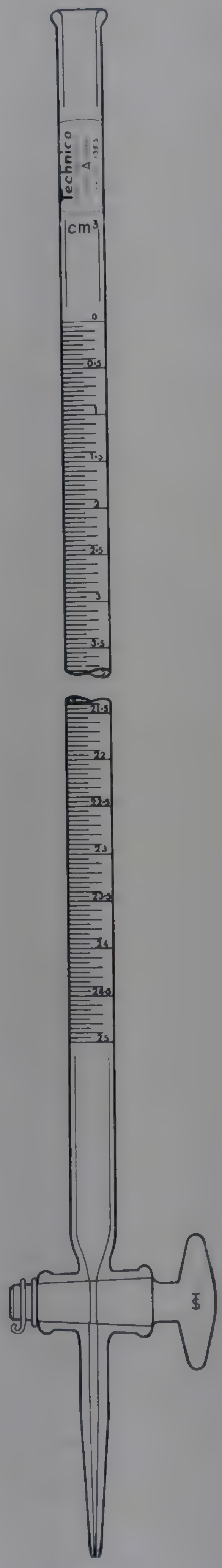


BW-085



BW-086
BW-087
BW-088

ST-440 Spare stopcock keys } see entries in
ST-650 Spare retaining springs } List No. sequence.

Technico
REGD. TRADE MARK

BURETTES WITH STRAIGHT INTERCHANGEABLE STOPCOCK

With permanent graduations and inscriptions in amber stain

BW-085

BURETTES, *Technico,* **Class B,** with **interchangeable** straight bore stopcock. The 5 and 10 cm³ burettes are fitted with an enlarged tube at the top for easy filling.

To deliver	5	10	25	50 cm³	
Subdivided in	0·05	0·02	0·1	0·1 cm³	
Ten	**£19·50**	**21·00**	**19·50**	**17·00**	ax
Each	**£ 2·20**	**2·35**	**2·20**	**1·90**	

BW-086

BURETTES, *Technico,* **Class A,** with **interchangeable** straight bore stopcock. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

To deliver	1*	2*	5*	10* cm³	
Subdivided in	0·01	0·02	0·05	0·02 cm³	
Ten	**£32·00**	**32·00**	**37·00**	**42·00**	ax
Each	**£ 3·60**	**3·60**	**4·10**	**4·70**	
To deliver	25	25	50	100 cm³	
Subdivided in	0·1	0·05	0·1	0·2 cm³	
Ten	**£34·00**	**42·00**	**36·00**	**41·00**	ax
Each	**£ 3·80**	**4·70**	**4·00**	**4·60**	

BW-087

BURETTES, *Technico,* **Class A,** with **interchangeable** straight bore stopcock, and **works certificate of examination** stating the volume delivered between zero and each of five points on the burette scale and the full scale delivery time for water. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

To deliver	1*	2*	5*	10* cm³	
Subdivided in	0·01	0·02	0·05	0·02 cm³	
Each	**£5·50**	**5·50**	**6·00**	**6·60**	ax
To deliver	25	25	50	100 cm³	
Subdivided in	0·1	0·05	0·1	0·2 cm³	
Each	**£5·70**	**6·60**	**5·90**	**6·50**	ax

BW-088

BURETTES, *Technico,* **BST stamped Class A,** with **interchangeable** straight bore stopcock, with BST certificate giving values at 5 test points. The 10 cm³ burette is fitted with an enlarged tube at the top for easy filling.

To deliver	10	25	50 cm³	
Subdivided in	0·02	0·05	0·1 cm³	
Each	**£18·90**	**18·90**	**18·40**	ax

Technico
REGD. TRADE MARK

BURETTES WITH DOUBLE OBLIQUE BORE STOPCOCK

With permanent graduations and inscriptions in amber stain

BW-134

BURETTES, *Technico,* **Class B,** with double oblique bore stopcock. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

To deliver	1*	2*	5*	10	10* cm³	
Subdivided in	0·01	0·02	0·05	0·1	0·02 cm³	
Ten	£17·50	19·50	20·00	14·00	22·00	ax
Each	£ 1·95	2·20	2·25	1·55	2·45	

To deliver	25	25	50	100 cm³	
Subdivided in	0·1	0·05	0·1	0·2 cm³	
Ten	£16·00	21·00	17·50	19·50	ax
Each	£ 1·80	2·35	1·95	2·20	

BW-136

BURETTES, *Technico,* **Class A,** with double oblique bore stopcock. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

To deliver	1*	2*	5*	10* cm³	
Subdivided in	0·01	0·02	0·05	0·02 cm³	
Ten	£42·00	43·00	44·00	53·00	ax
Each	£ 4·70	4·80	5·00	5·90	

To deliver	25	25	50	100 cm³	
Subdivided in	0·1	0·05	0·1	0·2 cm³	
Ten	£44·00	55·00	46·00	53·00	ax
Each	£ 5·00	6·20	5·10	5·90	

BW-137

BURETTES, *Technico,* **Class A,** with double oblique bore stopcock, and **works certificate of examination** stating the volume delivered between zero and each of five points on the burette scale and the full scale delivery time for water. The sizes marked * are fitted with an enlarged tube at the top for easy filling.

To deliver	1*	2*	5*	10* cm³	
Subdivided in	0·01	0·02	0·05	0·02 cm³	
Each	£6·50	6·60	6·80	7·70	ax

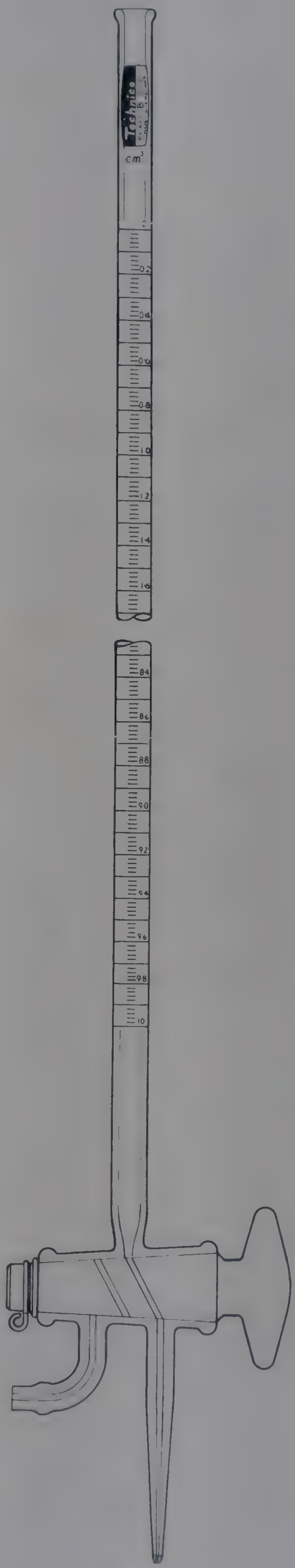
To deliver	25	25	50	100 cm³	
Subdivided in	0·1	0·05	0·1	0·2 cm³	
Each	£6·80	8·00	6·90	7·70	ax

BW-138

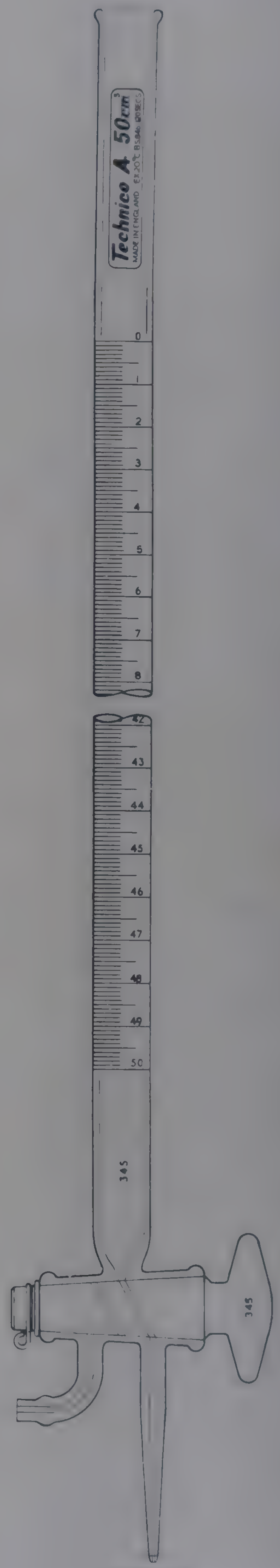
BURETTES, *Technico,* **BST stamped Class A,** with double oblique bore stopcock with BST certificate giving values at 5 test points. The 10 cm³ burette is fitted with an enlarged tube at the top for easy filling.

To deliver	10	25	50 cm³	
Subdivided in	0·02	0·05	0·1 cm³	
Each	£21·00	21·00	20·50	ax

ST-650 Spare retaining springs, see entry in List No. sequence.



BW-134



BW-136
BW-137
BW-138

Technico BURETTES

REGD. TRADE MARK

DIAPHRAGM STOPCOCK BURETTE

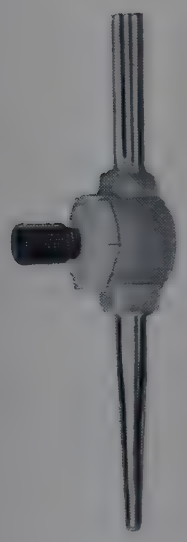
With permanent graduations and inscriptions in amber stain

BW-184

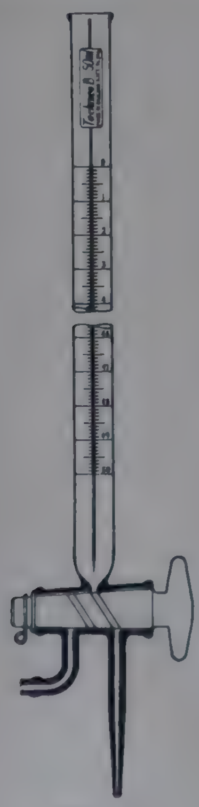
BURETTE, *Technico*, **Class B**, with *T & M* diaphragm stopcock. Capacity 50 cm³, subdivided in 0·1 cm³. The stopcock is polythene with a neoprene diaphragm and can be dismantled for cleaning. Suitable for use with reagents which tend to seize glass stopcocks or dissolve stopcock lubricants ... Ten **£13·40** Each **£1·50** *ax*

REPLACEMENT PARTS

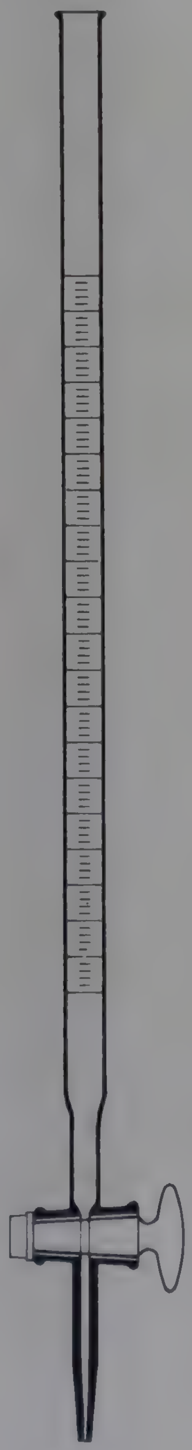
BW-185	**Burette**, with ground taper.	Ten	**£8·80**	Each	**£0·98**	*ax*
BW-186	**Burette jet**, with ground taper.	Ten	**£2·10**	Each	**£0·28**	*ax*
BW-187	**Burette stopcock**, polythene, complete with two interchangeable neoprene diaphragms.	Ten	**£2·50**	Each	**£0·31**	*fx*



Stopcock of BW-184



BW-294



BW-314

AMBER GLASS BURETTES

BW-224

BURETTES, *Technico*, **Class B**, of low-actinic amber stained glass, with straight bore stopcock.

To deliver	10	25	50 cm³	
Subdivided in	0·02	0·05	0·1 cm³	
Ten	**£26·50**	**26·50**	**19·50**	*ax*
Each	**£ 2·95**	**2·95**	**2·20**	

SCHELLBACH BLUE LINE BURETTES

With permanent graduations and inscriptions in amber stain

BW-284

BURETTES, *Technico*, **Class B**, with Schellbach blue and white enamel back, with straight bore stopcock.

To deliver	25	50 cm³	
Subdivided in	0·1	0·1 cm³	
Ten	**£24·50**	**27·00**	*ax*
Each	**£ 2·70**	**3·00**	

BW-294

BURETTES, *Technico*, **Class B**, with Schellbach blue and white enamel back, with double oblique bore stopcock.

To deliver	25	50 cm³	
Subdivided in	0·1	0·1 cm³	
Ten	**£34·00**	**36·00**	*ax*
Each	**£ 3·80**	**4·00**	

BW-304

BURETTE, *Technico*, **Class B**, with Schellbach blue and white enamel back, with double oblique bore stopcock and automatic zero. To deliver 50 cm³, subdivided 0·1 cm³ ... ... Each **£4·40** *ax*

PYREX BURETTES

BW-314

BURETTES, *Pyrex* glass, **Class B**, with straight bore stopcock.

To deliver	5	10	10	25	50 cm³	
Subdivided in	0·02	0·02	0·1	0·05	0·1 cm³	
Std. pack qty.	2	2	2	2	2	
Std. pack	**£3·85**	**4·20**	**3·60**	**4·65**	**4·05**	*jx*
Each	**£2·00**	**2·20**	**1·85**	**2·40**	**2·10**	

BW-316

BURETTES, *Pyrex* glass, **Class A**, with straight bore stopcock, and one-point test certificate.

To deliver	10	50 cm³	
Subdivided in	0·02	0·1 cm³	
Std. pack qty.	2	2	
Std. pack	**£8·15**	**9·40**	*jx*
Each	**£4·20**	**4·80**	

Technico BURETTES

REGD. TRADE MARK

DISPENSING BURETTES

BW-334

BURETTES, dispensing, *Technico*, **Class B,** with straight bore stopcock.

To deliver	250	500	1000 cm^3	
Subdivided in	1	5	10 cm^3	
Ten	**£30·00**	**34·00**	—	*ax*
Each	**£ 3·30**	**3·80**	**6·00**	

BULB BURETTES to BS 846, Part 2

BW-446

BURETTES, bulb, *Technico*, **Class A,** made to BS 846, Part 2, with interchangeable straight bore stopcock.

Total capacity	45	65	85	105 cm^3	
Bulb capacity	20	40	60	80 cm^3	
Scale range	25	25	25	25 cm^3	
Subdivided in	0·05	0·05	0·05	0·05 cm^3	
Each	**£6·40**	**6·40**	**6·40**	**6·40**	*ax*

AUTOMATIC ZERO BURETTES

BW-524

BURETTES, *Technico*, **Class B,** with automatic zero and double oblique bore stopcock.

To deliver	25	50	100 cm^3	
Subdivided in	0·1	0·1	0·2 cm^3	
Ten	**£26·50**	**28·00**	**36·00**	*ax*
Each	**£ 2·95**	**3·10**	**4·00**	

For similar burettes in Schellbach see BW-304.

BW-544

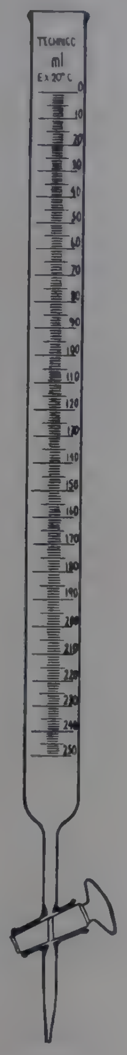
BURETTES, *Technico*, **Class B,** concentric tube pattern with automatic zero and nipple connection. With permanent graduations and inscriptions in amber stain. For use on a reservoir bottle.

To deliver	10	20 cm^3	
Subdivided in	0·1	0·1 cm^3	
Ten	**£14·00**	**16·00**	*ax*
Each	**£ 1·55**	**1·80**	

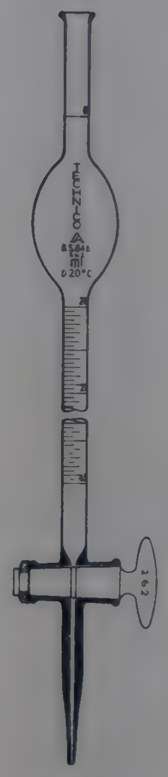
BW-554

BURETTES, *Technico*, **Class B,** concentric tube pattern BW-544, fitted to polythene bottle, complete with pinchcock BW-055. This assembly does not require a blowball as the burette is refilled by squeezing the bottle.

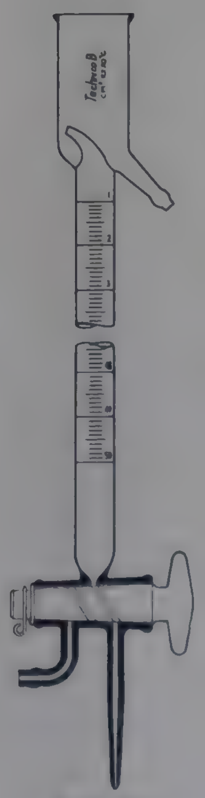
Burette capacity	10	20 cm^3	
Subdivided in	0·1	0·1 cm^3	
Bottle capacity	600	1200 ml	
Ten	**£17·00**	**23·00**	*bx*
Each	**£ 1·90**	**2·55**	



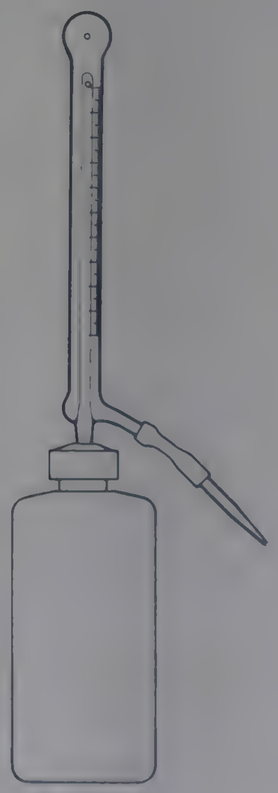
BW-334



BW-446



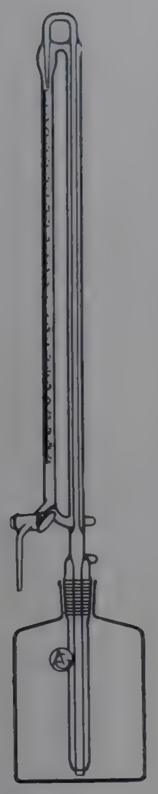
BW-524



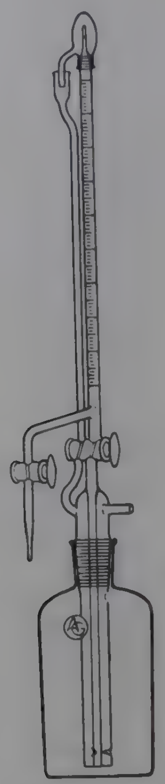
BW-554

Technico AUTOMATIC BURETTES

REGD. TRADE MARK



BW-584



BW-634

BW-584

BURETTES, *Technico,* **Class B,** with automatic zero and interchangeable stopcock. The burette is of very robust design, using a coaxial filling tube system for either suction or pressure operation. The low volume of the system results in particularly fast filling when suction is used. With either suction or pressure control, filling is achieved when a small vent is closed with the fingertip. For use with a protective atmosphere, suction operation must be used, and facility is provided for attachment of a suitable absorption guard tube. Complete with reservoir bottle.

To deliver	10	25	50 cm³	
Subdivided	0·05	0·1	0·1 cm³	
Reservoir	500	2000	2000 ml	
Joint size	24/29	29/32	29/32	
Each	**£9·80**	**9·80**	**9·80**	*ax*

ACCESSORY

AB-600 **Absorption tube.** For price see entry in List No. sequence.

BW-634

BURETTES, micro, *Technico,* **Class B,** automatic. Obviates the necessity of a hand or automatic release valve by using a filling stopcock designed to perform this function. When filling is completed the stopcock is reversed and automatically releases the pressure in the reservoir and returns the overflow. A separate interchangeable stopcock is used for operating the burette. This design is one of very few available for fully automatic operation on a micro-burette, and the zero arrangement is independent of surface tension. Fitted on a 500 ml reservoir bottle.

To deliver	2	5 cm³	
Subdivided in	0·01	0·02 cm³	
Each	**£11·55**	**13·65**	*ax*

REPLACEMENT PART for BW-584 and BW-634

BW-655 **Reservoir bottles.** For prices see entries in List No. sequence.

MICRO BURETTES

See also BW-754 and BW-786 in List No. sequence.

Gallenkamp

TITRATION BENCHES

PNEUMATIC AND GRAVITY FILLING MODELS

- **Shadowless, evenly illuminated work tops and viewing backs.**
- **Positions for up to 6 burettes on each bench.**
- **Burette supply and overflow tubing concealed behind viewing back.**

For details see FX-500 to FX-511 in List No. sequence.

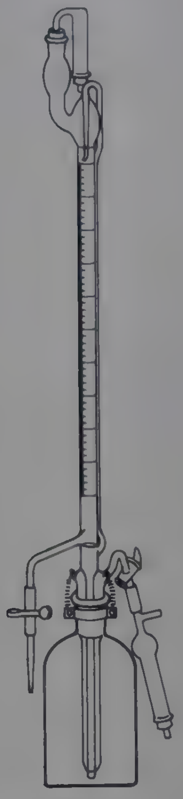
Technico AUTOMATIC BURETTES

REGD. TRADE MARK

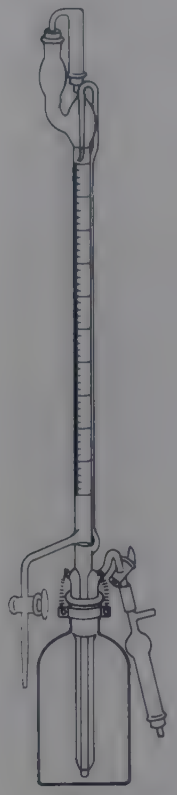
BW-644

BURETTES, *Technico,* **Class B,** automatic, to BS 1428, Part D1, with automatic zero adjustment and mounted on 500 ml reservoir bottle. The burette and reservoir bottle are made of borosilicate glass, as recommended by Pregl. Complete with metal clip fittings for securing the burette into the neck of the bottle, two moisture guard tubes, jet and pinchclip, and one pair of springs JR-140 size 38 mm.

To deliver	5	10	25 cm³	
Subdivided in	0·02	0·05	0·1 cm³	
Each	**£13·65**	**13·65**	**13·65**	*ax*



BW-644



BW-646
BW-647

BW-646

BURETTES, *Technico,* **Class A,** automatic, as BW-644, but fitted with interchangeable stopcock in place of pinchclip and jet.

To deliver	5	10	25 cm³	
Subdivided in	0·02	0·05	0·1 cm³	
Each	**£15·75**	**15·75**	**15·75**	*ax*

BW-647

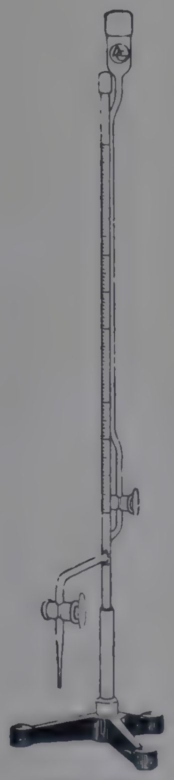
BURETTES, *Technico,* **Class A,** as BW-646, with **works certificate** giving values at 5 test points.

To deliver	5	10	25 cm³	
Subdivided in	0·02	0·05	0·1 cm³	
Each	**£18·90**	**18·90**	**18·90**	*ax*

REPLACEMENT PARTS for BW-584 to BW-647

BW-655 **Reservoir bottles, borosilicate glass.** Stable pattern with standard joint neck.

Capacity	500	2000 ml	
Socket	24/29	29/32	
Ten	**£12·80**	**25·50**	*ax*
Each	**£ 1·45**	**2·80**	



BW-754

BW-754

BURETTES, micro, *Technico,* **Class B,** with interchangeable stopcocks, mounted on tripod base with filling funnel offset so that the burette tube is free for cleaning. Burette tube and filling funnel fitted with glass caps.

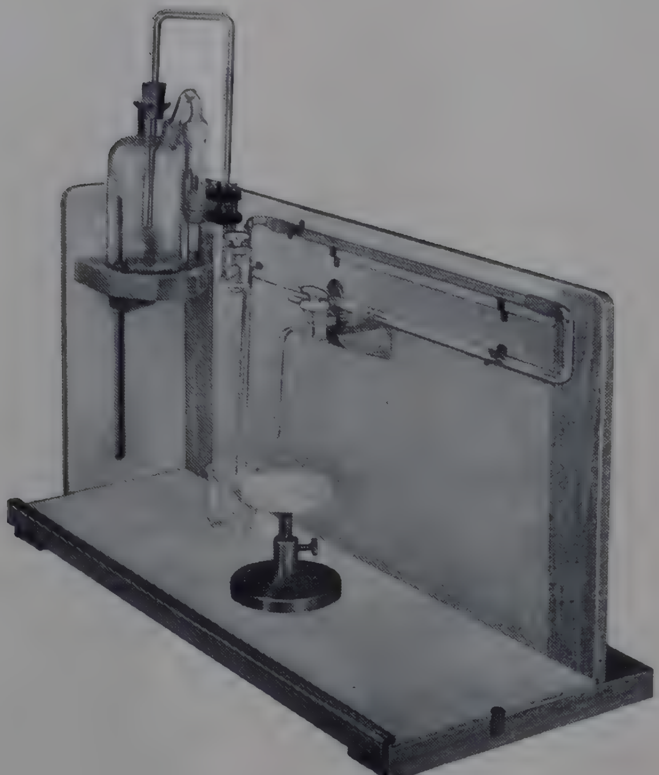
To deliver	2	5 cm³	
Subdivided in	0·01	0·02 cm³	
Each	**£7·70**	**7·70**	*ax*

BURETTES, Gas
Hempel
Martins
Tutweiler
see GAS ANALYSIS

TITRATION STANDS see ELECTROCHEMICAL ANALYSIS

Technico MICRO BURETTE

REGD. TRADE MARK



BW-786

BURETTE, micro, Conway, *Technico*, **Class A,** to deliver 0·25 cm^3, subdivided in 0·001 cm^3, and capable of being read to 0·00025 cm^3, the graduated tube being a length of precision bore tubing. The graduated burette tube is connected by plastics tubing to the remaining glass parts which are of borosilicate glass. Owing to the design of the burette and the relative capacities of burette tube and connecting tubes, the liquid which is delivered from the jet has been in contact only with borosilicate glass. The reservoir bottle is fitted with a guard tube. A ball and socket ground joint is fitted between the reservoir delivery tube and the burette stopcock tube to simplify cleaning, and minimise breakage. The burette is mounted on a wooden stand with white glazed base and a white background to the burette tube which enables accurate readings to be taken. The stand has an adjustable support for the reservoir bottle and an adjustable table under the delivery jet to take a micro-diffusion dish or a micro beaker. A full description of the burette and its method of operation is given in 'Microdiffusion Analysis and Volumetric Error' by Edward J. Conway, F.R.S., M.B., D.Sc.

BW-786

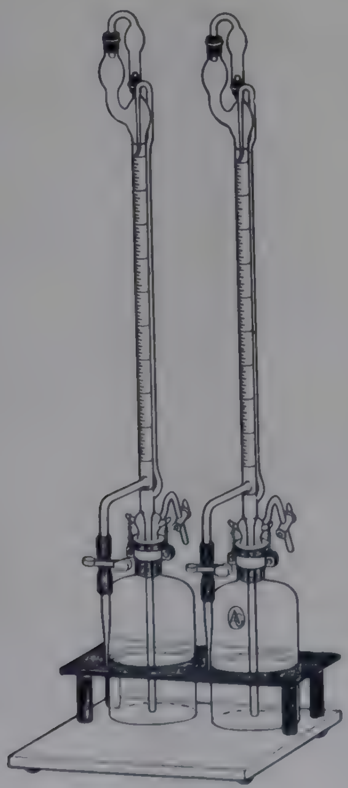
BURETTE, micro, Conway, *Technico*, **Class A,** as above specification ... ... Each **£38·50** *bx*

REPLACEMENT PARTS

BW-787	**Burette tube,** graduated	Each	**£2·65**	*ax*
BW-788	**Main connecting tube,** with 2 stopcocks and ball and socket joint	Each	**£4·60**	*ax*
BW-789	**Reservoir delivery tube,** with ball joint.	Each	**£1·25**	*ax*
BW-790	**Pressure balancing tube,** with stopcock, borosilicate glass...	Each	**£1·70**	*ax*
BW-791	**Reservoir bottle,** with 2 necks ...	Each	**£1·90**	*ax*
BW-792	**Moisture guard tube**	Each	**£0·80**	*ax*

Microdiffusion dishes for use with BW-786, see MD-120 et seq. in **MEDICAL SCIENCES.**

BURETTE ACCESSORIES



2× **BW-644** in **BW-881**

BW-880

BURETTE STAND, *Gallenkamp*, comprising white glazed base with black plastics support for reservoir bottle, mounted on rubber feet. To fit 500 ml bottle. Suitable for burettes BW-634, BW-644, BW-646 and BW-647. Each **£6·50** *bx*

BW-881

BURETTE STAND, *Gallenkamp*, as BW-880, but to take 2 burettes ... ... Each **£7·25** *bx*

BURETTE BRUSHES	see BU-460
BURETTE PINCHCOCK	see BW-055
BURETTE READER	see TJ-905
BURETTE STANDS	see SM-210/212, SM-230/243, SM-290, SM-434

For details see entries in List No. sequence.

BURNERS

Burners of all types are listed, according to the nature of gas to be used, under the following sub-headings:

TOWN (COAL) GAS
NATURAL (METHANE) GAS
LIQUIFIED PETROLEUM (BOTTLED) GAS
LIQUID FUEL

SELECTION CHART

	Town (coal) gas	Natural (methane) gas	LPG†
Bunsen	BX-020 BX-030 BX-035 BX-040	BX-220 BX-230 BX-035 BX-240	BX-420 BX-430 BX-035
Meker	BX-045 BX-054 BX-060	BX-254 BX-260	BX-445 BX-454 BX-460 BX-465 BX-470
Teclu	BX-075	BX-275	

	Town (coal) gas	Natural (methane) gas	LPG†
Fishtail	BX-077	BX-277	
Micro	BX-085 BX-095	BX-285	BX-485
Ring	BX-305	BX-305	
Amal Minor Major Maximus	BX-054 BX-060	BX-254 BX-260	BX-454 BX-460 BX-465

†Liquified petroleum gas

Gas lighters see LV-020 et seq. **Blowpipes** see BR-150 et seq.

For details and prices see entries in List No. sequence.

TOWN (COAL) GAS BURNERS

BX-020

BURNERS, Bunsen, for **coal gas,** fitted with air regulator.

Tube dia.	11	13 mm	
Ten	**£5·60**	**6·00**	*cx*
Each	**£0·62**	**0·66**	

BX-020

BX-030

BURNER, Bunsen, for **coal gas** with 13 mm dia. burner tube, air regulator, and by-pass tube for relighting.
Ten **£26·00** Each **£2·90** *cx*

BX-030

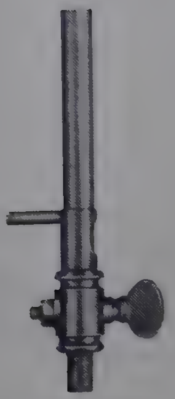
BX-035

BURNER, Bunsen, 'All Gases' for use with **coal gas, methane, butane, propane** or mixtures of these gases. With adjustable jet, air regulator, fine adjustment valve and variable baffle. Overall height 15 cm.
Ten **£18·00** Each **£2·00** *cx*

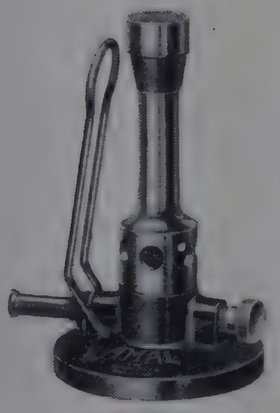
BX-035

TOWN (COAL) GAS BURNERS

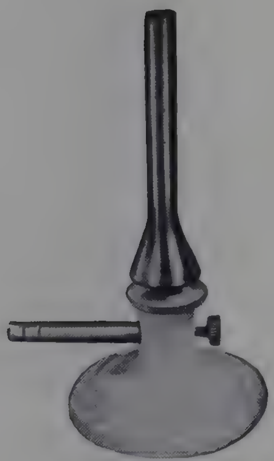
(continued)


BX-040

BX-045



BX-054
BX-060


BX-075

BX-077

BX-085

BX-095

BX-040

BURNER, Bunsen, pipeline, for **coal gas,** with 11 mm dia. burner tube threaded $\frac{1}{8}$ in BSP for screwing into gas supply lines, air regulator and stopcock.
Ten **£15·00** Each **£1·70** *cx*

BX-045

BURNERS, Meker, for **coal gas,** with refractory disk to produce a stable high temperature flame.

Disk dia.	18	22 mm	
Ten	**£26·00**	**30·00**	*cx*
Each	**£ 2·90**	**3·30**	

BX-054

BURNER, Meker, *Amal* **Minor,** for **coal gas,** with adjustable needle valve. Head dia. 25 mm.
Each **£2·81** *mx*

BX-060

BURNER, Meker, *Amal* **Major,** for **coal gas,** with adjustable needle valve. Head dia. 43 mm.
Each **£3·46** *mx*

BX-075

BURNER, Teclu, for **coal gas,** with 13 mm dia. burner tube, air regulator and gas control needle valve.
Ten **£15·00** Each **£1·70** *cx*

BX-077

BURNER, fishtail benchlight, for **coal gas,** 25 cm high. Suitable for working small diameter soda-lime glass tubing ... ... Ten **£6·00** Each **£0·66** *cx*

BX-085

BURNER, micro, for **coal gas,** with 5 mm dia. burner tube and air regulator and gas control needle valve.
Ten **£8·40** Each **£0·94** *cx*

BX-095

BURNER, micro, for **coal gas,** with air and gas regulators. The burner jet position is adjustable, and the burner height can be set from bench level up to maximum of 15 cm ... ... Each **£6·00** *cx*

BX-305

BURNER, ring, for use with coal gas. See entry on opposite page.

NATURAL (METHANE) GAS BURNERS

NOTE: A natural gas bunsen burner will generally have a lower maximum heat output than a coal gas burner of the same nominal tube diameter.

BX-220

BURNERS, Bunsen, for **methane,** fitted with air regulator.

Tube dia.	11	13	16 mm	
Ten	**£8·00**	**9·00**	**10·00**	*cx*
Each	**£0·90**	**1·00**	**1·12**	

BX-230

BURNER, Bunsen, for **methane,** with 13 mm dia. burner tube, air regulator and by-pass tube for relighting.
Ten **£38·00** Each **£4·20** *cx*

BX-035

BURNER, Bunsen, 'All Gases'. See entry in List No. sequence.

BX-240

BURNER, Bunsen, pipeline, for **methane.** With 11 mm dia. burner tube threaded ⅛ in BSP for screwing into gas supply lines, air regulator and stopcock.
Ten **£17·00** Each **£1·90** *cx*

BX-254

BURNER, Meker, *Amal* **Minor,** for **methane.** With fitted No. 55 jet and one each Nos. 50, 60 and 70 jets. Head dia. 25 mm ... ... Each **£2·81** *mx*

BX-260

BURNER, Meker, *Amal* **Major,** for **methane.** With fitted No. 160 jet and one each Nos. 150, 170 and 180 jets. Head dia. 43 mm ... ... Each **£3·46** *mx*

BX-275

BURNER, Teclu, for **methane** with 16 mm dia. burner tube, air regulator and gas control needle valve.
Ten **£23·50** Each **£2·60** *cx*

BX-277

BURNER, fishtail benchlight, for **methane,** 25 cm high. Suitable for working small diameter soda-lime glass tubing ... ... Ten **£9·00** Each **£1·00** *cx*

BX-285

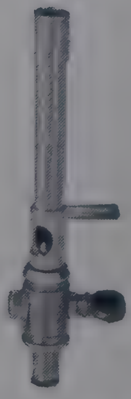
BURNER, micro, for **methane.** With 8 mm dia. burner tube and air regulator and gas control needle valve.
Ten **£11·00** Each **£1·25** *cx*

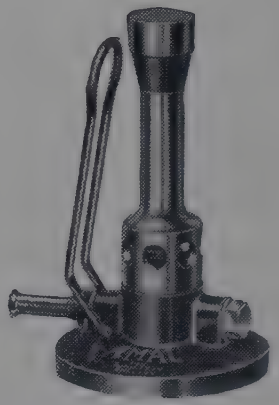
BX-305

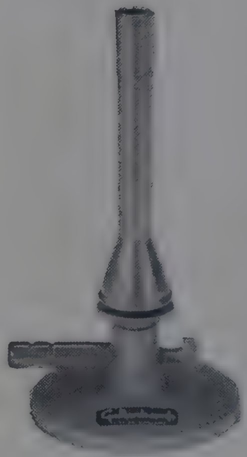
BURNER, ring, for use with **methane** or **coal gas.** Fitted with injector for methane and supplied with alternative injector for coal gas. Mounted on vitreous enamelled heat deflecting base. With air and gas regulators. Overall dimensions 30 × 21 × 8 cm high.
Each **£4·00** *cx*

BX-220

BX-230


BX-240


BX-254
BX-260


BX-275

BX-285

BX-277

BX-305

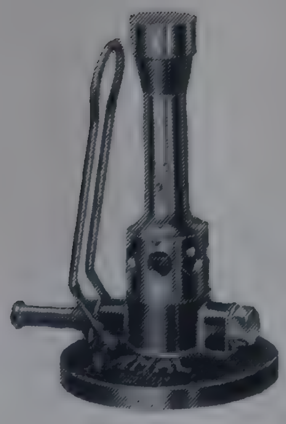
LIQUEFIED PETROLEUM (BOTTLED) GAS BURNERS

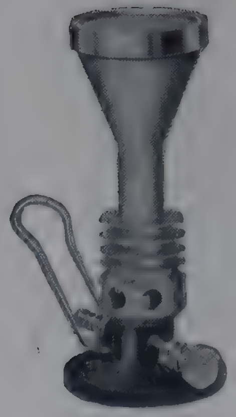
BX-420

BX-430

Note: The abbreviation 'cm W.G.' is used for 'centimetres water gauge pressure'.

BX-445


BX-454
BX-460


BX-465

BX-420

BURNERS, Bunsen, for **butane** at 28 cm W.G. and **propane** at 33 to 35 cm W.G. With air regulator.

Tube dia.	11	13 mm	
Ten	**£8·00**	**9·00**	*cx*
Each	**£0·90**	**1·00**	

BX-430

BURNER, Bunsen, for **butane** at 28 cm W.G. and **propane** at 33 to 35 cm W.G. With 13 mm dia. burner tube. air regulator and by-pass tube for relighting.

Ten **£38·00** Each **£4·20** *cx*

BX-035

BURNER, Bunsen, 'All Gases'. See entry in List No. sequence.

BX-445

BURNERS, Meker, for **butane** at 28 cm W.G. and **propane** at 33 to 35 cm W.G. With refractory disk to produce a stable high temperature flame.

Disk dia.	18	22 mm	
Ten	**£26·00**	**30·00**	*cx*
Each	**£ 2·90**	**3·30**	

BX-454

BURNER, Meker, *Amal* **Minor** for **butane** and **propane** at approx. 28 cm W.G. With fitted No. 25 jet and one each No. 20, 30 and 35 jets. Head dia. 25 mm.

Each **£2·81** *mx*

BX-460

BURNER, Meker, *Amal* **Major** for **butane** and **propane** at approx. 28 cm W.G. With fitted No. 40 jet and one each No. 30, 50 and 60 jets. Head dia. 43 mm.

Each **£3·46** *mx*

BX-465

BURNER, Meker, *Amal* **Maximus,** for **butane** and **propane** at approx. 28 cm W.G. Designed to give an equivalent amount of heat as the *Amal* Major BX-060 burning coal gas. With three fixed No. 50 jets and needle valve. Head dia. 60 mm ... ... Each **£8·15** *mx*

ASBESTOS BOARD	see AR-470 et seq.
BLOWPIPES	see BR-150 et seq.
GAUZES	see GK-100 et seq.
TRIANGLES	see TV-540 et seq.
TRIPODS	see SM-910 et seq.

LIQUEFIED PETROLEUM (BOTTLED) GAS BURNERS

(continued)

***BX-470**

BURNER, Meker, *Labogas,* for use with expendable **butane** cartridge. Provides flame temperatures up to 1100°C and consumes approx. 60 g/hour at full flame. Overall height 19 cm, flame dia. 20 mm. Complete with air and flame adjustment valves and clip to hold cartridge, but **supplied without cartridge.**

Each **£3·47** *mx*

ACCESSORY

***BX-472** **Butane cartridge,** 10 cm high × 9 cm dia., containing 200 g of butane. In pack of three.

12 packs **£9·00** Pack **£0·86** *mx*

BX-470 with BX-472

BX-485

BX-485

BURNER, micro, for **butane** at 28 cm W.G. and **propane** at 33 to 35 cm W.G. With 8 mm dia. burner tube and air regulator and gas control needle valve.

Ten **£11·00** Each **£1·25** *cx*

LIQUID FUEL BURNERS

BX-750

BURNERS, for **methylated spirit,** with wick holder, wick and ground-on cap to reduce evaporation when not in use.

Capacity	60	125 ml	
Ten	**£5·40**	**5·60**	*cx*
Each	**£0·60**	**0·62**	

BX-750

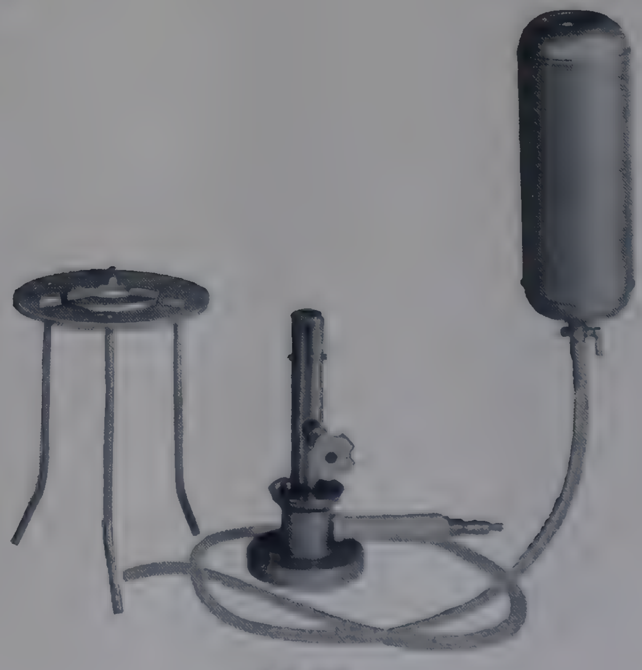
BX-800

BURNER, Bunsen, Barthel type, for use with methylated spirit. Suitable for the Naked Flame Test described in BS 738 and the Spirit Burner Test described in BS 3289, 3497 and 3503. Complete with 1 litre capacity fuel reservoir, 1·5 metres of flexible transparent plastics tubing, tripod with removable centre piece, one each fine and coarse gauzes, pricker and instructions.

Each **£18·50** *cx*

REPLACEMENT PART

BX-804 **Burner only** ... ... Each **£12·50** *cx*



BX-800

METRIC SI UNITS AND BRITISH EQUIVALENTS

Selected from BS 3763 : 1970 and other sources.

SI BASE UNITS

metre (m) — unit of length.
kilogram (kg) — unit of mass.
second (s) — unit of time.
ampere (A) — unit of electric current.
kelvin (K) — unit of thermodynamic temperature.
candela (cd) — unit of luminous intensity.
mole (mol) — unit of amount of substance.

SI SUPPLEMENTARY UNITS

radian (rad) — unit of plane angle.
steradian (sr) — unit of solid angle.

SI DERIVED UNITS

having special names and symbols

hertz (Hz) — unit of frequency.
newton (N) — unit of force.
pascal (Pa) — unit of pressure.
joule (J) — unit of energy.
watt (W) — unit of power.
coulomb (C) — unit of quantity of electricity.
volt (V) — unit of electric potential.
farad (F) — unit of electric capacitance.
henry (H) — unit of electric inductance.
ohm (Ω) — unit of electric resistance.
siemens (S) — unit of electric conductance.
weber (Wb) — unit of magnetic flux.
tesla (T) — unit of flux density.
lumen (lm) — unit of luminous flux.
lux (lx) — unit of illuminance.

NAMES AND SYMBOLS FOR SI PREFIXES

Factor	Prefix	Symbol
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{2}	hecto	h
10^{1}	deca	da
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a

UNITS RECOGNISED BY CIPM

(Comité International des Poids et Mesures)

minute (min) = 60 s.
hour (h) = 3600 s.
degree (°) = $\pi/180$ rad.
litre (l) = 1 dm^{3}.
degree Celsius (°C)
angstrom (Å) = 0·1 nm.
standard atmosphere (atm) = 101 325 Pa.
bar (bar) = 100 k Pa.

BRITISH MEASURES AND EQUIVALENTS (approx.)

1 inch (in) = 2·5400 cm.
1 square inch (in^{2}) = 6·4516 cm^{2}.
1 cubic inch (in^{3}) = 16·387 cm^{3}.
1 cubic foot (ft^{3}) = 28·317 dm^{3}.
1 pint (pt) = 568·262 cm^{3}.
1 U.K. gallon (gall) = 4·546 dm^{3}.
1 fluid ounce (fl oz) = 28·413 cm^{3}.
1 ounce (oz) * = 28·350 g.
1 pound (lb) * = 0·4536 kg.
(* avoirdupois).

METRIC MEASURES AND EQUIVALENTS (approx.)

1 centimetre (cm) = 0·3937 in.
1 square centimetre (cm^{2}) = 0·1550 in^{2}.
1 cubic centimetre (cm^{3}) = 0·0610 in^{3}.
= 0·0352 fl oz.
1 cubic decimetre (dm^{3}) = 0·0353 ft^{3}.
1 gram = 0·0353 oz *.
1 kilogramme = 2·2046 lb *.
* avoirdupois).

UNITS OF PRESSURE

1 atm = 760 mm Hg = 29·9213 in Hg.
= 101 325 N/m^{2} = 101 325 Pa.
= 1·0332 kgf/cm^{2} = 14·696 lbf/in^{2}.
1 bar = 750·062 mm Hg = 29·53 in Hg.
= 1×10^{5} N/m^{2} = 1×10^{5} Pa.
= 1·0197 kgf/cm^{2} = 14·504 lbf/in^{2}.
1 lbf/in^{2} = 6894·76 N/m^{2} = 6894·76 Pa.
= $6{\cdot}89476\times10^{-2}$ bar.
= $7{\cdot}0307\times10^{-2}$ kgf/cm^{2}.
1 torr = 1/760 atm = 1 mm Hg.
= 1·3332 m bar.

DERIVED UNITS IN TERMS OF BASE UNITS (examples)

speed, velocity	m/s; ms^{-1}.
acceleration	m/s^{2}; ms^{-2}.
density	kg/m^{3}; kg m^{-3}.
concentration	mol/m^{3}; mol m^{-3}.
dynamic viscosity	kg/(ms); (Pa s).
surface tension	kg/s^{2}; (Nm^{-1}).

CALCULATING SLIDE RULES

CA-510

SLIDE RULE, *Unique*, **pocket,** 125 mm. A thin all plastics rule. With A, B, C, C1, D, LL_2, LL_3, S and T scales. Supplied in a sheath-type plastics case with instructions ... ... Each **£0·80** *mx*

CA-515

SLIDE RULE, *Unique*, 250 mm. A general purpose rule with scales faced in non-fading plastics. Scales A, B, C, D, LL_2, LL_3, S and T. Supplied in durable case with instructions ... ... Each **£1·00** *mx*

CA-520

SLIDE RULE, *Thornton*, **Model AD 060 standard.** A single face slide rule for general purpose use, without trigonometrical and log log scales. With scales A, C, C1, CF, D, DF, K, cm and inches. Supplied in durable case with instructions ... ... Each **£2·35** *mx*

CA-522

SLIDE RULE, *Thornton*, **Model AD 050 log log.** A slide rule for use where trigonometrical and log log scales are required. With scales A, B, C, C1, D, L, LL_2, LL_3, S, 1Sd, ST and T. Supplied in durable case with instructions. Each **£2·35** *mx*

CA-537

SLIDE RULE, *Thornton*, **Model AA 010 comprehensive.** A comprehensive slide rule for use in professional work and advanced studies. The scales are distributed over both faces of the rule. With scales A, B, C, C1, CF, D, D1, DF, K, L, LL_1, LL_2, LL_3, LL_{01}, LL_{02}, LL_{03}, Ps, Pt, S, Sd, 1Sd, ST, T, Td and 1Td. Supplied in durable case with instructions ... ... Each **£5·00** *mx*

HV-570

SLIDE RULE, relative humidity, for calculations from readings of wet and dry bulb hygrometers. For price and details see entry in List No. sequence.

*CA-550

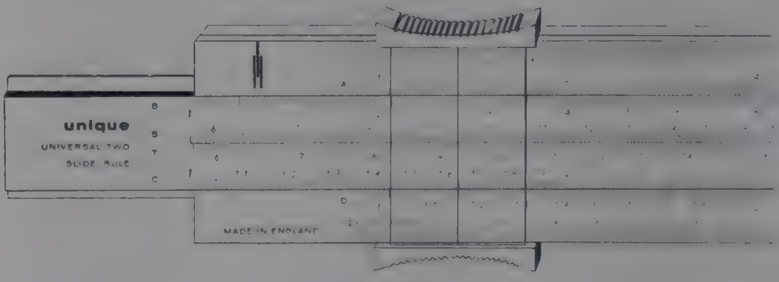
SLIDE RULE, Nestler Chemists, 250 mm long. A precision comprehensive rule for chemists with scales giving atomic and molecular weights in addition to C, D, L and C1 scales. Formulæ of elements and radicals are marked on the face and back of the slide, whilst elements and compounds to be determined are marked on the stock. In addition there is a table of atomic weights and molecular weights of compounds and radicals on the back of the rule. Very useful for rapid calculations connected with analysis and synthesis. Supplied in case with cursor and instructions ... ... Each **£5·20** *mx*

CA-580

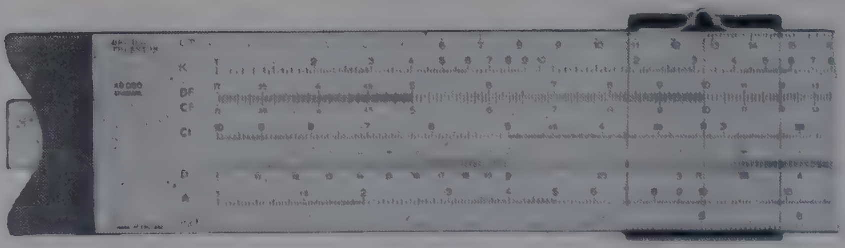
CALCULATOR, Otis King Model K, equivalent to a 168 cm slide rule, comprising two cylinders, one rotating and sliding within the other, with spiral scales on both and a cursor tube carrying an engraved arrow at each end. Maximum dia. 33 mm, closed length 150 mm, open length 255 mm. Supplied in case with instructions. Each **£4·50** *mx*

The following abbreviations are used to simplify specifications of slide rules:

A	— scale of squares on stock	— x_D^2
B	— scale of squares on slide	— x_C^2
C	— basic scale on slide (x_C)	— x
D	— basic scale on stock (x_D)	— x
C1	— reciprocal of C scale	— $1/x_C$
D1	— reciprocal of D scale	— $1/x_D$
CF	— π displaced C scale	— πx_C
DF	— π displaced D scale	— πx_D
K	— cube of C scale	— x_C^3
L	— log to base 10 of C scale	— $\log_{10} x_C$
LL_1	— log-log scale	— $e^{0.01x}$
LL_2	— log-log scale	— $e^{0.1x}$
LL_3	— log-log scale	— e^{x}
LL_{01}	— log-log scale	— $e^{-0.01x}$
LL_{02}	— log-log scale	— $e^{-0.1x}$
LL_{03}	— log-log scale	— e^{-x}
Ps	— vector analysis scale	— $\sqrt{1-s^2}$
Pt	— vector analysis scale	— $\sqrt{1+t^2}$
S	— sine scale (5° 42′ to 90°)	— $\sin^{-1} x_D$
Sd	— sine differential scale	— $\alpha/\sin\alpha$
1Sd	— inverse sine differential scale	— $x/\sin^{-1}x$
ST	— small angle sin tan scale (0° to 5° 42′)	— $\sin^{-1} x_D$ — $\tan^{-1} x_D$
T	— tangent scale (5° 42′ to 90°)	— $\tan^{-1} x_D$
Td	— tangent differential scale	— $\alpha/\tan\alpha$
1Td	— inverse tangent differential scale	— $x/\tan^{-1}x$



CA-515



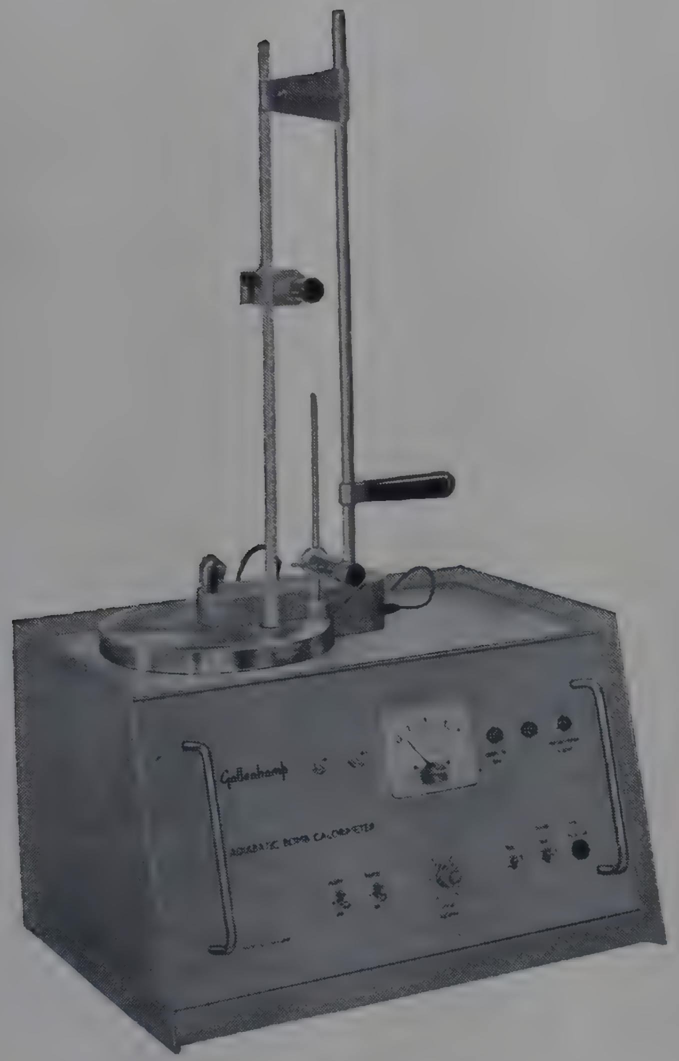
CA-520

CA-580

Gallenkamp AUTOBOMB

An Automatic Adiabatic Bomb Calorimeter for the rapid and accurate determination of calorific values of

- **COAL, COKE AND OTHER FUELS**
  - **PETROLEUM PRODUCTS**
    - **FOODSTUFFS AND BIOLOGICAL MATERIALS**



CB-100

Suitable for BS 1016, BS 3804, IP 12, ASTM D240, DIN 51708, DIN 51785.

- **Automatic adiabatic system ensures negligible heat loss from calorimeter during test period—eliminates cooling correction calculations.**
- **Top cover assembly on telescopic lift—no dismantling between tests.**
- **No handling of calorimeter thermometer—risk of breakage negligible.**
- **Instantaneous heating for accurate response.**
- **High speed water circulation through jacket and cover for temperature uniformity.**
- **Only two thermometer readings necessary for each test.**
- **Console encloses calorimeter and all control circuits, cables and water connections.**
- **Firing wire continuity tester circuits give visual indication of successful firing.**
- **Swing down control panel for immediate access for servicing.**
- **Printed circuit for reliability.**
- **Includes exclusive illuminated reader/vibrator for thermometer.**

OPERATION

The automatic adiabatic system employed in the Autobomb prevents exchange of heat between the calorimeter and jacket by ensuring that at every instant throughout the test, the jacket is at the same temperature as the calorimeter vessel which it wholly encloses. Thus, the system eliminates both the tedium of a large number of thermometer readings and the calculation of a cooling correction.

The circuit of the control system is basically simple and therefore reliable.

The overall design reduces manipulation and the possibility of unsuccessful attempts at firing. Both the determination of the effective heat capacity (cal/degC) of the calorimeter system and the determination of the calorific values (cal/g or BTU/lb) of samples are rapid and accurate.

Having been filled and prepared, the bomb is placed in the calorimeter vessel which has previously been filled with water and the jacket lid is lowered to put into position **in one single movement** the calorimeter cover, calorimeter stirrer, thermometers, thermistor assemblies and bomb firing connector. When the connector is pressed home the 'READY TO FIRE' lamp lights.

When the apparatus has stabilised, the firing switch is depressed and after a suitable period the final equilibrium temperature is noted and checked. Preparation for the next test involves merely switching off the heater, raising the jacket lid with its mounted components and swinging it to the rear, and removing the bomb.

Calorimeter thermometer. This is an expensive item so that its safe mounting on the jacket lid, without the need for removal between tests is particularly important in reducing breakage risks.

The illuminated reader/vibrator, which facilitates the taking of accurate thermometer readings, is controlled by a push-button on the front panel.

Gallenkamp AUTOBOMB

(continued)

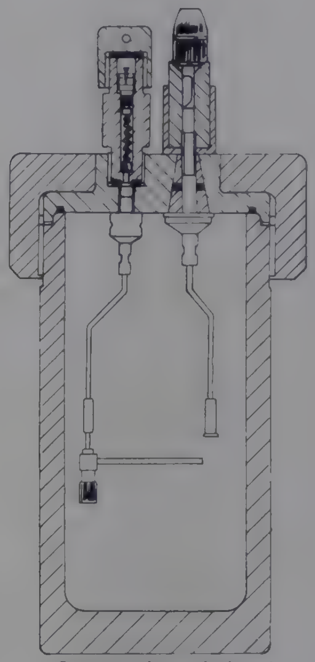
DESIGN DETAILS

Bomb. The capacity is approximately 300 ml. The body and cap are forged stainless steel bar to BS 1506-845 Grade B. This is a stabilised austenitic steel which has a high corrosion resistance and is not subject to intercrystalline corrosion. The cap is secured by a locking ring machined from rolled aluminium bronze bar. The joint between the body and cap is made by a toroidal sealing ring which enables a perfectly gas-tight seal to be effected by hand tightening only. The oxygen filling point is fitted with a Schrader valve and the union between the bomb and filling tube, sealed by a toroidal sealing ring, is also designed for tightening by hand. Avoidance of the use of tools results in less wear to parts of the bomb. Two stainless steel electrodes are fitted to the cap; one has a ring-shaped support for flanged crucibles and is electrically connected to the cap and the other is insulated by means of a laminated plastics bush.

Every bomb is subjected to a hydraulic pressure test at 4500 lbf/in² maintained for 10 minutes, and a certificate of test is issued. The certificate gives full details of the mechanical properties and chemical composition of the materials used in the construction of the bomb.

Bomb firing circuit. This circuit is fed from an earthed winding on the mains transformer. It includes a fuse, a test circuit and a lamp which shows when the firing wire has fused. A remote firing switch accessory is available and is easily connected.

Calorimeter vessel. This is made of stainless steel, polished outside, and two litres of water just cover the bomb. Three metal pegs are fixed inside to support the bomb a sufficient distance from the bottom to allow free circulation of water round the bomb, and a wire lifting handle facilitates assembly into the water jacket.



Section through bomb
CB-200

Console and water jacket. All control circuits are mounted on the swing-down front panel for ease of inspecting and servicing. They comprise an a.c. bridge, printed circuit amplifier, heater relay circuit, bomb 'test', 'ready for firing' and 'fire' systems and all associated switches, fuses, indicator lamps and meter.

The jacket and lid are constructed of stainless steel, polished inside.

The calorimeter vessel is located inside the water jacket by a spacer which has the dual purpose of minimising thermal contact between the two and at the same time provides an adequate return path for the bomb firing circuit. The calorimeter is stirred by an independent motor mounted on the water jacket cover. A heat break in the stirrer shaft prevents conduction of heat to or from the calorimeter.

CB-100

AUTOMATIC ADIABATIC BOMB CALORIMETER, *Gallenkamp* AUTOBOMB.

Outfit comprising one each of the following:—

CB-110	Console (includes thermometer reader/vibrator and instructions manual)
CB-200	Bomb
CB-215	Bomb stand
CB-220	Pressure gauge on stand
CB-225	Tube assembly
CB-230	Tube assembly
CB-235	Needle valve
CB-234	Two spanners
CB-351	Pad of report sheets
GD-421	Tool set

For 200/250V 50 Hz single phase (line to earthed neutral) supplies—see **NOTE below.**
Outfit **£573·00** *bx*

For 110/130V 50 or 60 Hz single phase supplies ... ... Outfit **£579·00** *bxN*

When ordering please state voltage and frequency of supply.

NOTE: When 220V mains electricity supplies are phase-to-phase (110-0-110V) it is necessary to isolate the apparatus using a 1 : 1 transformer which has an earthed secondary and a 10A rating.

Thermometers, crucibles and firing wire are not included in the above outfit because several alternatives are available. A working outfit guide is given on page 105.

Gallenkamp AUTOBOMB COMPONENTS

CB-110

CONSOLE, *Gallenkamp,* comprising calorimeter vessel with stirrer, adiabatic water jacket with heater, circulating pump control circuits, as specification, in outer case, together with a thermometer reader/vibrator. Overall dimensions with cover raised 51·5 × 40 × 109 cm high.

Without bomb, thermometers, accessories or spare parts but including instruction manual.

For 200/250V 50 Hz single phase (line to earthed neutral) supplies—see NOTE on page 103 ... Each **£415·00** *bx*

For 110/130V 50 or 60 Hz single phase supplies. Each **£421·00** *bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

CB-115	**Stand-by spares kit, for CB-110,** comprising one matched pair thermistor elements CB-142, one each amplifier and thyratron valves, three each cartridge fuses 1A, 5A and 10A for 200/250V models (2A, 5A and 15A for 110/130V models) two indicator lamps 14V, two illuminator lamps 6·3V and two gaskets for water pump.	Kit	**£11·00**	*bx*

When ordering please state voltage.

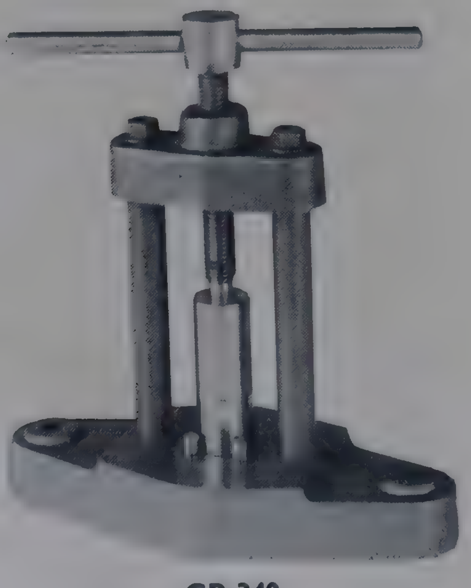
CB-141	**Thermistor assemblies,** matched pair.	Pair	**£21·00**	*bx*
CB-142	**Thermistor elements,** matched pair.	Pair	**£4·20**	*bx*

When ordering replacement parts, please state serial number of calorimeter and supply voltage.

CB-200

CB-215

CB-220



CB-340

CB-200

BOMB, *Gallenkamp,* to specification, with works certificate of test ... ... Each **£113·00** *bx*

REPLACEMENT PARTS

CB-203	**Stand-by spares kit, for CB-200,** comprising twenty toroidal sealing rings CB-204; 2 packs of high pressure Schrader valve cores CB-206; one valve housing CB-207; one pair of electrodes with ring support for crucibles of up to 25 mm diameter, sealing ring and set of insulators CB-208; 1 pack toroidal sealing rings CB-226; 1 pack end ferrules CB-231 and 6 metres of nylon tubing CB-232 for tube assemblies	Kit	**£22·00**	*bx*
CB-204	**Toroidal sealing ring.** Ten **£2·10**	Each	**£0·28**	*bx*
CB-206	**Valve cores. Schrader high pressure type,** supplied in packs containing five	Pack	**£1·05**	*bx*
CB-207	**Valve housing**	Each	**£1·65**	*bx*
CB-208	**Electrodes,** with ring support for crucibles of up to 25 mm dia., sealing ring and set of insulators.	Set	**£12·00**	*bx*

ACCESSORY

CB-212	**Pressure release valve,** with side arm for connecting to absorption apparatus. For use when determining nitrogen and sulphur corrections. Pressure in bomb may be released immediately after test thereby saving the usual waiting period for the acid mist to settle.	Each	**£6·75**	*bx*

CB-215

STAND, light alloy for supporting bomb cap when fitting crucible and firing wire ... ... Each **£4·45** *bx*

CB-220

PRESSURE GAUGE, calibrated 0-50 atm with non-splintering transparent front and blow-out plate in the rear ... ... Each **£15·00** *bx*

CB-225

TUBE ASSEMBLY, nylon, 90 cm long, for connecting bomb to pressure gauge CB-220 ... Each **£3·15** *bx*

REPLACEMENT PARTS

CB-226	**Toroidal sealing ring**	Pack of 10	**£1·10**	*cx*
CB-231	**End ferrule,** for nylon tubing	For prices see entries in List No. sequence.		
CB-232	**Nylon tubing**			

CB-230

TUBE ASSEMBLY, nylon, 90 cm long, for connecting pressure gauge CB-220 to needle valve CB-235. Each **£2·00** *bx*

REPLACEMENT PARTS

CB-231	**End ferrule,** for nylon tubing ...	Pack of 10	**£0·35**	*cx*
CB-232	**Nylon tubing**	Metre	**£0·15**	*cx*

ACCESSORY

CB-234	**Spanner,** $\frac{3}{16}$ BSW for CB-225 and CB-230 and union nuts.	Each	**£0·35**	*mx*

CB-235

NEEDLE VALVE, for oxygen cylinder, with 37·5 atm blow-off valve, bull nosed inlet to BS 341 and fitting to accept CB-230 ... ... Each **£11·00** *cx*

Gallenkamp AUTOBOMB ACCESSORIES

CRUCIBLES

CB-260

CRUCIBLE, nickel chromium, general purpose for testing coal to BS 1016 Part 5. 25 mm dia. × 18 mm deep with flange ... ... Ten **£5·90** Each **£0·66** *cx*

CB-262

CRUCIBLE, as CB-260 but **silica** ... Each **£1·50** *mx*

CB-276

CRUCIBLE, inconel, type 1 to IP 12 for testing fuels with flash points below 100°F. Base 19 mm dia., top 12·7 mm dia. × 19 mm deep, with flange. Ten **£24·50** Each **£2·70** *bx*

CB-278

CRUCIBLE, inconel, type 2 to IP 12 for testing fuels with flash points above 100°F. 19 mm dia. × 19 mm deep with flange ... Ten **£9·00** Each **£1·00** *bx*

FIRING ACCESSORIES

CB-280

FIRING WIRE, platinum, 44 swg (approx. 0·08 mm dia.) ... ... Reel approx. 4·5 metres **£2·45** *mx*

CB-282

FIRING WIRE, nickel chromium, 36 swg (approx. 0·19 mm dia.) ... Reel approx. 23 metres **£0·45** *cx*

CB-312

REMOTE FIRING SWITCH ASSEMBLY, comprising a biased-off switch mounted in a control box suitable for fixing to bench or wall and fitted with 9 metres of twin core cable ... ... Each **£7·50** *bx*

CB-320

CAPSULE, gelatine, of stated approx. gross calorific value, for burning highly volatile liquids. In pack of 10. 10 packs **£1·30** Pack **£0·20** *cx*

CB-325

BENZOIC ACID, Thermochemical Standard. In sealed tube containing 100 g ... ... Tube **£2·10** *mx*

CB-330

FIRING COTTON, 13/14s scoured and bleached, 5–6 mg/cm in balls of about 110 g ... ... Each **£0·40** *cx*

MISCELLANEOUS ACCESSORIES

CB-340

BRIQUETTE PRESS, for solid fuels, with hardened steel punch and die 12·5 mm dia. The press has a screw action and is intended to be bolted to a bench top. Each **£16·50** *bx*

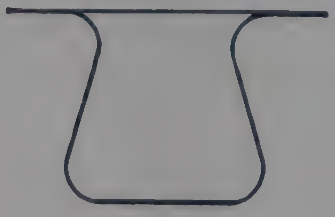
For illustration see page 104.

CB-351

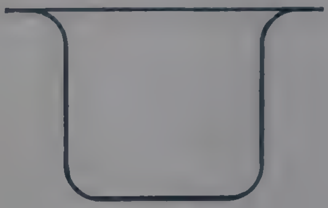
REPORT SHEETS, for recording observations during calorific value determinations with adiabatic calorimeter, in pads of 100 sheets ... ... Each **£0·90** *cx*

CB-353

INSTRUCTIONS MANUAL, for Autobomb CB-100, extra copies ... ... Each **£0·60** *bx*



CB-276



CB-278

THERMOMETERS

FOR CALORIMETER to BS 791.

List No.	List No. with NPL Certificate	BS 791 Schedule mark	Scale span °C
TJ-564	**TJ-565**	Cal. 15 to 21 C	15 to 21
TJ-566	**TJ-567**	Cal. 18 to 24 C	18 to 24
TJ-568	**TJ-569**	Cal. 21 to 27 C	21 to 27
TJ-570	**TJ-571**	Cal. 24 to 30 C	24 to 30
TJ-572	**TJ-573**	Cal. 27 to 33 C	27 to 33
TJ-574	**TJ-575**	Cal. 30 to 36 C	30 to 36
TJ-576	**TJ-577**	Cal. 33 to 39 C	33 to 39

FOR WATER JACKET

TJ-070

THERMOMETER, range −5 to +50°C.
For prices of above thermometers see entries in List No. sequence.

WORKING OUTFIT

1. The following list is a guide to the items required for an initial working outfit:

1 Autobomb outfit	CB-100.
10 crucibles (depending on samples and test specifications)	CB-260 to CB-278 as selected.
2 calorimeter thermometers (depending on initial temperatures)	TJ-564 to TJ-577 as selected.
5 reels firing wire	CB-280 or CB-282.
1 ball firing cotton	CB-330.
1 tube benzoic acid	CB-325.
1 briquette press	CB-340.
2 water jacket thermometers	TJ-070 range −5 to +50°C.
1 each spares kits (recommended)	CB-115 and CB-203.

2. In addition the following are required:
3 lengths of flexible tubing (TX-772 or TX-520 N6.5) for water connections. Lengths as necessary to reach nearest tap and sink.

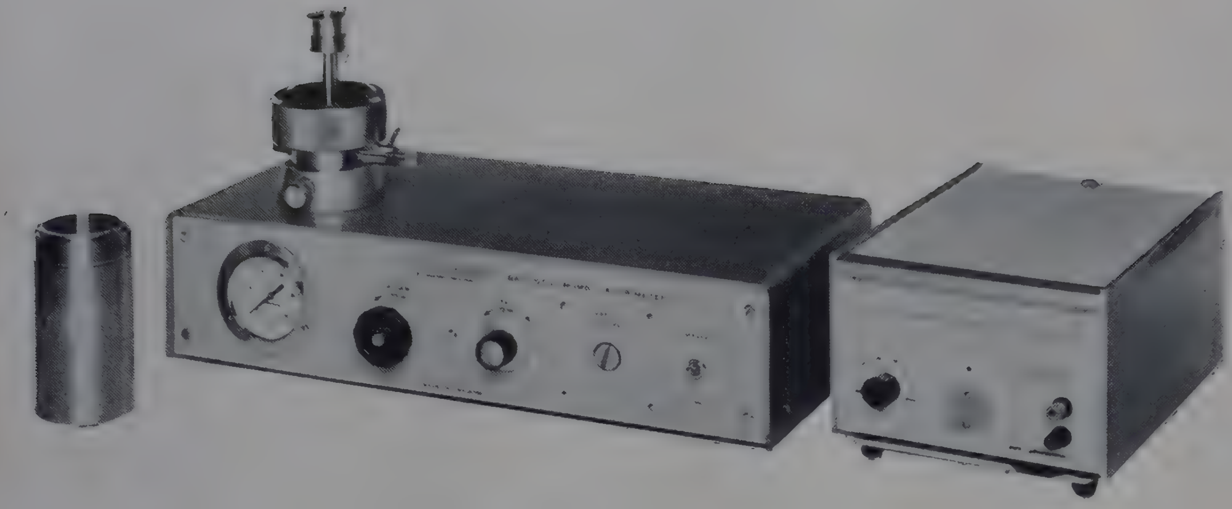
   An analytical balance to weigh the sample.

   A heavy duty balance capacity about 3 kg to at least 1 g to weigh the calorimeter vessel plus water.

3. For determining the CV of liquid fuels, order also:
1 remote firing switch assembly CB-312.

Gallenkamp BALLISTIC BOMB CALORIMETER

for the rapid determination of calorific values of food, animal feeds and faeces in dietetic research and other applications.



- **10 results per hour**
- **No special skill required**
- **Repeatability about 1%**
- **Hand sealing bomb, no tools for assembly**

OPERATION

In ascertaining the calorific value of foodstuffs and other non-homogeneous materials, it is frequently difficult to obtain a truly representative single sample. In such cases the average of a number of approximate results can be superior to a single, accurate result from one sample.

The object of the Ballistic Bomb Calorimeter is to enable this to be done with speed. The heat of combustion causes a rapid rise in temperature of the bomb, shown as a 'throw' on the galvanometer spot. It is assumed, as in other ballistic instruments, that the peak galvanometer reading occurs before there is any significant heat loss from the bomb and its contents.

Having established the 'constant correction' (see Bomb firing system below) for the heat dissipated by the firing wire and cotton, the operator has merely to place the sample in the crucible, tamp down with the tool provided, attach the cotton wicking, screw on the bomb body, fill the bomb with oxygen, press the timed firing button and read the maximum galvanometer deflection. The whole operation takes only a few minutes and calculation of calorific value to about 1% is by simple proportion comparison with a benzoic acid standard.

Developed in collaboration with D. S. Miller and P. R. Payne at the Human Nutrition Research Unit of the M.R.C.

REFERENCES

(1) Laboratory Practice, 8, 119 (1959).
(2) *News and Review* No. 2, December 1960.
(3) Fox, Miller and Payne, Proc. Nutr. Soc. 18 ix (1959).
4 Miller and Payne, Brit. J. Nutr, 12, 501 (1959).

DESIGN

Bomb

The body and base are machined from forged stainless steel bar to BS 1506–845 Grade B, which is a stabilised austenitic steel generally recognised as being the most satisfactory for calorimeter bombs. The body is secured to the base by an aluminium bronze locking ring and the joint is sealed by a toroidal ring which provides a gas-tight seal by hand tightening only. In the base are an oxygen filling point, a gas pressure release needle valve, two sockets for the connection of the electric firing circuit, a pillar to carry the crucible and an insulated electrode. The firing wire is connected between the pillar and the electrode.

Oxygen filling system

Comprising a needle valve and a pressure gauge which has a safety glass front and a blowout back. Union fittings are provided for a nylon oxygen supply tube and a nylon bomb filling tube. A hand tightening union nut with a toroidal ring is used to seal the filling tube to the bomb.

Bomb firing system

Comprising a press button operated electric timing switch and a step down transformer. This system applies 2V to the firing wire for sufficient time to raise it to red heat and ignite the sample. The wire is not affected by the firing and can be used repeatedly. The timing switch is self resetting so that the same amount of heat is introduced each time the bomb is fired. This results in a constant correction which simplifies the test procedure and the calculation of results.

Temperature measuring system

The temperature reached by the bomb body above the crucible is indicated by a light spot galvanometer connected to a thermocouple which plugs into a shallow hole in the top of the bomb body.

Gallenkamp BALLISTIC BOMB CALORIMETER

CB-370

BOMB CALORIMETER, BALLISTIC, *Gallenkamp*. Outfit comprising base control box with one each of the following items and full operating instructions.

CB-234	2 Spanners	CB-380	Bomb filling tube
CB-260	10 Crucibles	CB-386	Battery
CB-325	1 Tube benzoic acid	CB-388	Reducing valve
CB-330	Firing cotton	CB-390	Tube assembly
CB-375	Ballistic bomb	CB-395	Thermocouple
CB-376	Firing wire	CB-402	Galvanometer

For 200/250V 50 Hz single phase supplies ... ... Outfit **£366·50** *bx*
For 110/120V 50 or 60 Hz single phase supplies ... ... Outfit **£370·50** *bxN*

When ordering please state voltage and frequency of supply.

ACCESSORIES

CB-373

STAND-BY SPARES KIT for CB-370, comprising ten each toroidal sealing rings CB-204 and CB-226, ten end ferrules CB-231 and two metres nylon tubing CB-232 and one galvanometer lamp ... ... Kit **£4·40** *bx*

CB-325
BENZOIC ACID
CB-330
FIRING COTTON

For details see entries in List No. sequence.

COMPONENTS

CB-375

BALLISTIC BOMB, *Gallenkamp*, as specification, with works certificate of test. **Without firing wire.**
Each **£164·00** *bx*

ACCESSORY AND REPLACEMENT

CB-376 **Firing wire,** platinum alloy ... ... Each **£8·00** *bx*
CB-204 **Toroidal sealing ring.** For price see entry in List No. sequence.

CB-260

CRUCIBLE, nickel chromium. For details and price see entry in List No. sequence.

CB-380

BOMB FILLING TUBE, high pressure nylon, 28 cm long, for connecting bomb to outlet on base control box.
Each **£2·25** *bx*

REPLACEMENT PARTS

CB-226 **Toroidal sealing ring,** for CB-380 ...
CB-231 **End ferrule,** for nylon tubing ...
CB-232 **Nylon tubing** ... ...

For prices see entries in List No. sequence.

CB-234

SPANNER, $\frac{3}{16}$ BSW, for CB-380 and CB-390 union nuts. For price see entry in List No. sequence.

CB-386

BATTERY, 1·5V, *Ever Ready* D18 ... Each **£0·20** *mx*

CB-388

REDUCING VALVE, for connecting to standard oxygen cylinders to give a constant output pressure which is adjustable over the range 20 to 30 atm. The valve is fitted with a blow-off on the outlet side set to operate at 32·5 atm and a union to accept tube assembly CB-390.
Each **£27·50** *bx*

CB-390

TUBE ASSEMBLY, 90 cm long, high pressure nylon, for connecting reducing valve CB-388 to base control box.
Each **£1·45** *bx*

REPLACEMENT PARTS

CB-231 **End ferrule,** for nylon tubing
CB-232 **Nylon tubing** ... ...

For prices see entries in List No. sequence.

CB-395

THERMOCOUPLE, with plug and terminations.
Each **£3·95** *bx*

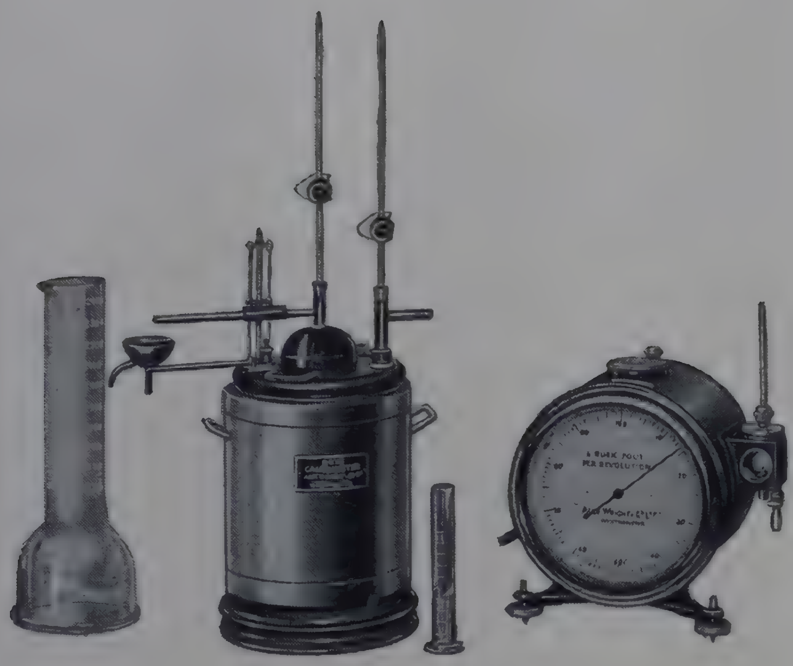
CB-402

GALVANOMETER, spot, nominal resistance 38 ohm. For 200/240V 50 Hz single phase supplies.
Each **£47·00** *mx*

For 110/120V 50 or 60 Hz single phase supplies.
Each **£47·00** *mx*

When ordering replacement parts please state serial number of calorimeter and supply voltage.

BOYS GAS CALORIMETER



CB-500 etc.

CB-500

GAS CALORIMETER, Boys, non-recording, for the determination in SI units of calorific values of **coal gases** from about 15 to 22·5 MJ/m³. Comprises Boys calorimeter vessel, Hyde pattern gas meter with fittings and case, all necessary thermometers, glass measures and tubing, and gas pressure regulator, manometers, gauges and automatic cut-off device.
Each **£306·00** *fxN*

CB-501

GAS CALORIMETER, Boys, as CB-500 but for measurements in Btu/ft³ from about 400 to 600 Btu/ft³.
Each **£311·40** *fxN*

CB-530

GAS CALORIMETER, Boys, non-recording, as **CB-500 but for the determination in SI units** of calorific values of **natural (methane) gases** at about 38 MJ/m³ ... . Each **£311·40** *fxN*

CB-531

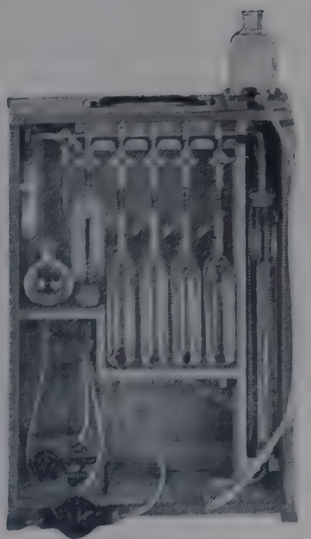
GAS CALORIMETER, Boys, as CB-530 but for measurements in Btu/ft³ at about 1000 Btu/ft³.
Each **£311·40** *fxN*

NOTE: Gas calorimeters CB-500 to CB-531 are for use in ambient temperatures up to 30°C. Details of models for higher ambient temperatures on application. Available also for gases of other calorific values; please give full details of gas to be tested.

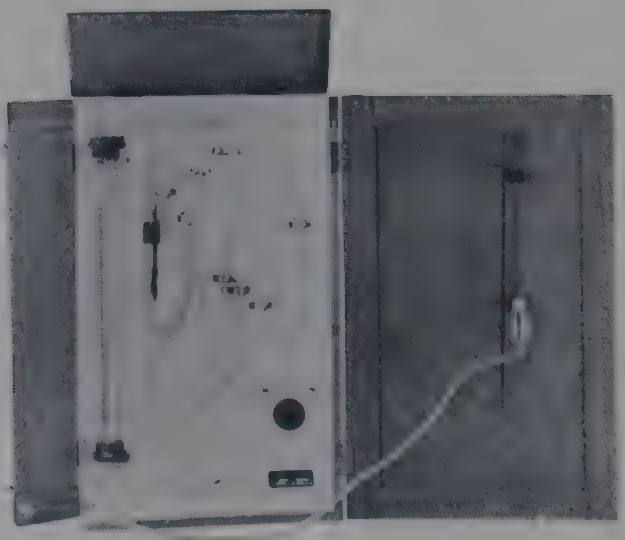
Gallenkamp GAS ANALYSERS

REGD TRADE MARK

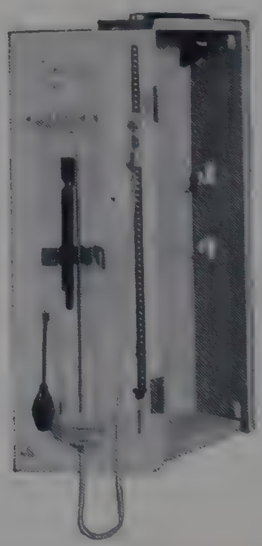
For determination of O_2, CO_2, CO, CH_4 and H_2 in flue and fuel gases.



Orsat Gas Analysers, approximate accuracy 1%.
See GC-020 to GC-120.



Haldane Gas Analysers, approximate accuracy 0·05%.
See GC-300 to GC-350.



Lloyd Gas Analysers, approximate accuracy 0·02%.
See GC-400 to GC-414.

For details see entries in List No. sequence.

CC-932
CARBOY PUMP. Constructed of polythene except for the operating bulb which is of rubber and does not come in contact with the liquid. With sliding tapered stopper suitable for use in containers having neck diameters from 48 to 67 mm. Pumping rate approximately 5 litres/min ... ... Each **£4·25** *fx*

***CC-942**
CARBOY SIPHON, polythene, self priming. Comprises a flexible bulb and suction tube 36 cm long by 9 mm bore and an outlet tube 45 cm long by 9 mm bore. Flow rate approximately 4 litres/min ... ... Each **£0·65** *cx*

***CC-945**
CARBOY SIPHON, polythene, self priming. Comprises a flexible bellows, suction tube 70 cm long by 10 mm bore and outlet tube 95 cm long by 10 mm bore fitted with a stopcock. A sliding tapered stopper on the suction tube fits containers with neck diameters from 35 to 64 mm. Flow rate approximately 7 litres/min. Each **£2·40** *mx*

CC-962
CARBOY TIPPER, stove enamelled welded steel. A carboy may be placed in the frame and harnessed by a ring round the neck so that it can be safely tilted for emptying. With 15 cm rubber tyred wheels and trolley handle ... ... Each **£44·50** *cx*

CC-965
CARBOY POURER, PVC. To fit 45 litre carboys made to BS 678 and similar with neck not exceeding 84 mm outside dia. ... ... Each **£4·20** *cx*

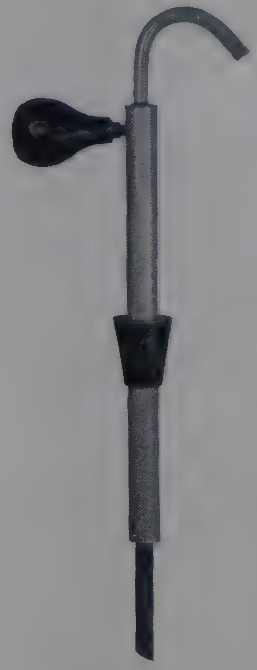
CC-980
CARBOY/BOTTLE TROLLEY, stove enamelled welded tubular steel, with 15 cm rubber tyred wheels. Two hinged hooks are arranged to support a carboy hamper and a shaped cross bar to engage the handle of the larger sizes of bottles BT-510 ... Each **£26·00** *cx*

PROTECTIVE CLOTHING

CP-705 to CP-720	**Aprons**	**CP-835 to CP-890**	**Goggles and Face Shields**
CP-816 and CP-820	**Gloves**	**CP-898 to CP-920**	**Respirators**

For details see entries in List No. sequence.

CARIUS FURNACE see FURNACES
CASSEROLES see BASINS

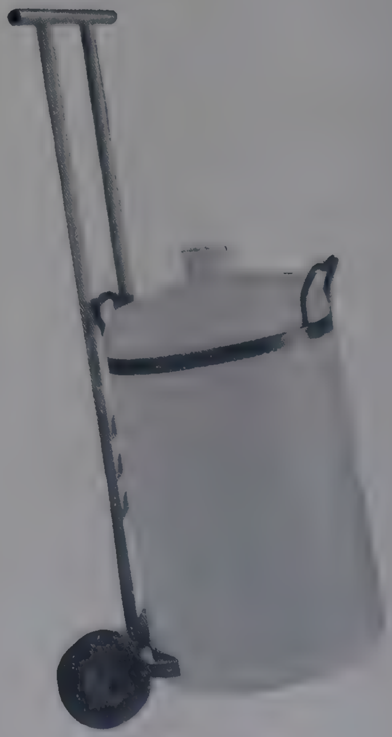

CC-932

CC-942

CC-945

CC-962

CC-965


CC-980 with BT-510

CD-500

CD-500

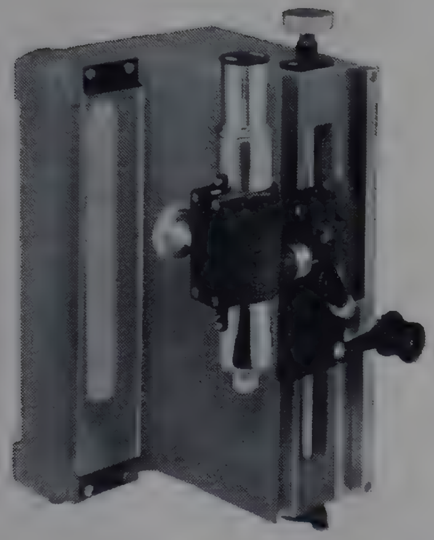
CATHETOMETER, for vertical working. With telescope mounted on a carriage which slides along a square brass bar.

Range 0·01 to 500 mm with vernier reading.

The telescope has a ×10 Ramsden eyepiece with cross-wire and auxiliary lens, 2·5 cm objective and rack and pinion focusing from 40 cm to infinity. Mounted on a heavy tripod base.

Overall dimensions 95×59×59 cm. Weight 20 kg.

Each **£78·00** *fx*



CD-520

CD-520

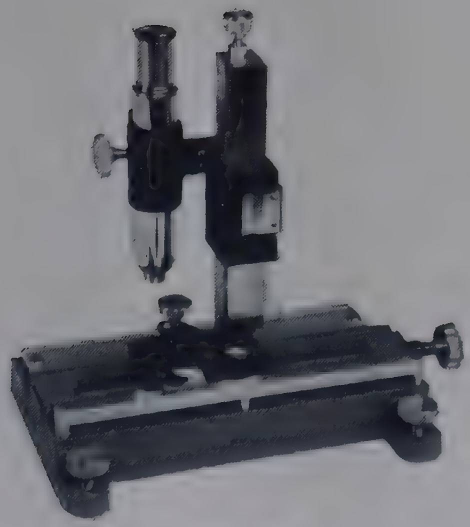
MEASURING MICROSCOPE, for horizontal or vertical working. With sliding carriage and microscope which can be mounted with its axis in any one of three directions with respect to travel.

Range 0·01 to 165 mm with vernier reading.

The carriage can be locked and fine adjustment of movement is provided. The microscope has a ×7 Ramsden eyepiece with crossline graticule, 5 cm working distance objective giving ×20 magnification and rack and pinion focusing. A removable glass stage plate is mounted in the base. In hardwood case.

Overall dimensions 35×19×22 cm. Weight 10 kg.

Each **£55·50** *fx*



CD-530

CD-530

MEASURING MICROSCOPE, with horizontal and vertical scales.

Horizontal range 0·01 to 165 mm with vernier reading.

Vertical range 0·01 to 120 mm with vernier reading.

Comprising base, horizontal carriage with magnifier and vertical carriage with microscope. Both carriages can be locked and fine adjustment of movement is provided. The microscope has a ×7 Ramsden eyepiece, with cross-wire graticule, 5 cm working distance objective giving a ×20 magnification and rack and pinion focusing. A removable glass stage plate is mounted in the base. In hardwood case.

Overall dimensions 34×25×23 cm. Weight 10 kg.

Each **£75·50** *fx*

ACCESSORIES for CD-520 and CD-530

CD-535 **Telescope objective,** to increase the working distance to approximately 20 cm. Interchangeable with microscope objective ... ... Each **£3·43** *fx*

CD-540 **Illumination base,** comprising 23 cm fluorescent tube mounted in an aluminium case. The top of the case is designed to locate the vernier microscopes CD-520 and CD-530 and provide full illumination of the stage plates. For 230V 50 Hz supplies ... ... Each **£23·06** *fx*

Gallenkamp CeCa

CONTROLLED ENVIRONMENT CULTURE APPARATUS

By providing close control over chemical and physical conditions, CeCa creates a stable environment for long term continuous growth of bacteria, fungi, algae, protozoa, viruses and cultured plant and animal cells.

For full details see CX-650 in List No. sequence.

CENTRIFUGES

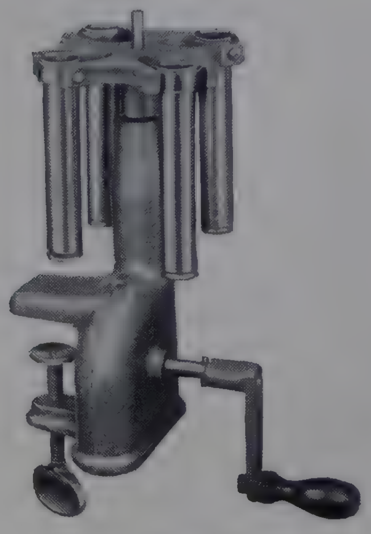
HAND CENTRIFUGE

CF-050

CENTRIFUGE, hand drive. A robust cast housing, with integral bench clamp, encloses a gear train which enables the centrifuge to be hand turned with the minimum of effort. Includes removable handle and 4-place swing out head with buckets for 15 ml centrifuge tubes.
Without tubes ... ... Each **£10·50** *fx*

ACCESSORIES

CJ-040 et seq. **Centrifuge tubes,** 15 ml capacity. For details and prices see entries in List No. sequence.



CF-050

CENTRIFUGAL BASKET FILTER

***CF-130**

CENTRIFUGAL BASKET FILTER, comprising a perforated aluminium basket 15 cm dia. × 5 cm high rotating in transparent plastics bowl with lid. The basket has a nylon gauze strainer for coarse filtration or crystal drying. For finer filtration, filter paper strip 5 cm wide can be used. With drain spout and entry port so that continuous filtration can be carried out. For 220/250V a.c. supplies only. Overall dimensions 18 cm dia., 28 cm high. Weight 4 kg ... ... Each **£11·90** *fx*

ACCESSORIES

CK-515 **Filter paper,** grade 1
CK-535 **Filter paper,** grade 3MM
} For details and prices see entries in List No. sequence.

CF-130

Gallenkamp STUDENT SEMI-MICRO CENTRIFUGE

An inexpensive quiet running centrifuge ideal for students performing semi-micro chemical analyses.

- **Designed for short period sedimentations—replaces slow filtration methods**
- **Two-place horizontal swing-out head for 10 ml tubes**
- **Brushless spark-free motor**
- **Biased switch ensures that motor is not left running when not in use**
- **Overall dimensions only 28 cm dia. and 23 cm high**

CF-200

CENTRIFUGE, *Gallenkamp,* **student, semi-micro,** speed approximately 2000 rev/min. With two-place head and buckets which accept 75 × 10 mm test tubes, induction motor drive and biased-off switch. The bowl and base are combined in a light alloy diecast housing with hinged cover. **Without glassware.**

For 220/240V 50 Hz single phase supplies. Each **£19·00** *bx*

For 110/120V 60 Hz single phase supplies. Each **£21·00** *bxN*

When ordering please state voltage and frequency of supply.

Gallenkamp

CF-200

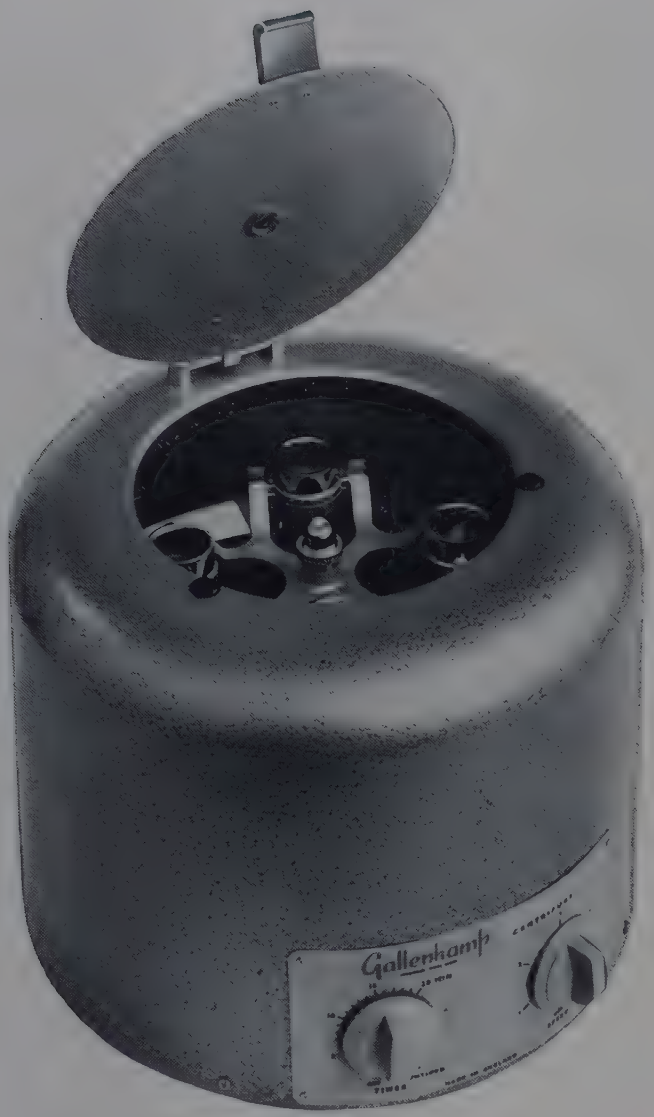
ACCESSORIES

TF-180 **Test tubes,** *Pyrex brand,* 75 × 10 mm For price see entry in List No. sequence.

Gallenkamp LABORATORY CENTRIFUGE

Maximum capacity 200 ml.

Suitable for use in medical and small industrial laboratories. Accepts tubes of up to 50 ml capacity.



CF-405 with accessories

- Maximum speed 5000 rev/min
- Choice of angle and swing-out heads
- Self-balancing action
- Repeatable five-step speed control
- Built-in timer

GENERAL DESIGN

The centrifuge has a robust guard bowl and cover which completely enclose the head. In operation a continuous stream of air is drawn through the bowl and all parts remain cool, even after long periods of use. The motor and controls are housed below the bowl and, although totally enclosed for safety, they are readily accessible for the routine servicing. The interior of the bowl and all external surfaces are finished with a smooth easily cleaned stoved enamel which is resistant to abrasion and corrosion.

MOTOR

The motor is supported on flexible rubber mountings. This enables the axis of rotation of the motor to change as required to compensate for slightly out-of-balance loads without communicating this movement to the housing. Critical balancing of tubes is, therefore, unnecessary and the centrifuge will run quietly in conditions which would be unacceptable with a rigid mounting. Television interference suppression is fitted.

CONTROLS

The speed control switch, which has an 'OFF' and five speed positions, allows accurate repetition of operating speed. The speeds are chosen so that the change in centrifugal force is approximately the same from one step to the next.

The timer can be set to give automatic control of running time up to 20 min; it can also be set for continuous running. Tachometer CF-480 can be inserted through the aperture in the cover.

HEADS

A choice of swing-out and angle heads is available. They are located on the tapered motor shaft and are held in place by a milled nut. All the heads are accurately balanced and designed for smooth running at maximum speed. The versatility of the heads is increased by the 2-place trunnion and by adapters which can be used in the buckets to accommodate tubes for micro work, Wintrobe tests, etc. Capacities, speeds and RCF values for the various heads are listed opposite.

DIMENSIONS: 30 cm high × 35 cm diameter.
WEIGHT: 10 kg.
POWER RATING, max.: 500W.

Gallenkamp LABORATORY CENTRIFUGE

REGD. TRADE MARK

CF-405

CENTRIFUGE, *Gallenkamp*, as specification, maximum speed 5000 rev/min. With enclosed self-balancing drive, five-step speed control and automatic timer with continuous run position. **Without heads or accessories.** For single phase supplies.

For 220/240V 50 Hz ... ... Each **£61·00** *bx*
For 200/210V 50 Hz ... ... Each **£61·00** *bxN*
For 110/120V 50 or 60 Hz ... ... Each **£61·50** *bxN*

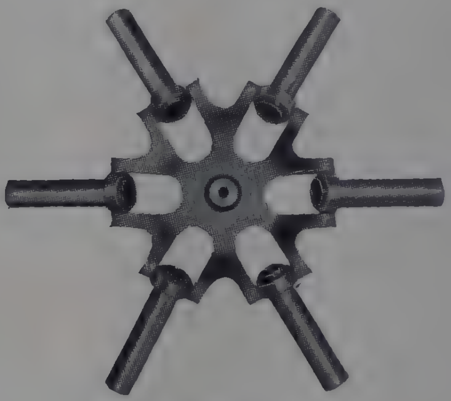
When ordering please state voltage and frequency of supply.

REPLACEMENT PART
CF-407 **Carbon brushes,** for motor ... ... Pair **£0·50** *bx*
When ordering replacement parts please state serial number of centrifuge and supply voltage.

ACCESSORIES

HEAD SPEEDS AND RCF VALUES

LIST No.	TYPE	LOAD No.×ml	MAX. SPEED rev/min	MAX. RCF ×g
CF-410	swingout	6×15	3,000	1,500
CF-425	,,	4×50 8×15	3,000	1,500
CF-460	angle	6×15	5,000	2,750


CF-410
with accessories

CF-410

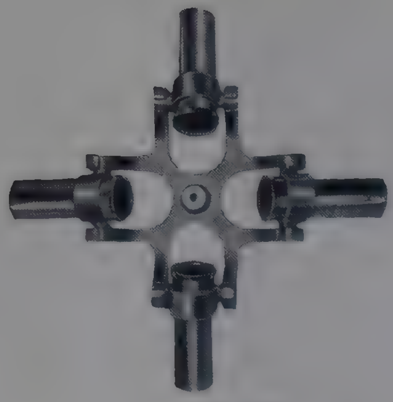
SWING-OUT HEAD, *Gallenkamp*, **6-place,** for 15 ml buckets. **Supplied with trunnions but without buckets, cushions or tubes** ... ... Each **£15·00** *bx*

ACCESSORIES
CF-418 **Bucket, 15 ml,** stainless steel. Requires cushion CJ-305. Ten **£9·00** Each **£1·00** *bx*
CJ-305 **Cushion.** For details see entry in List No. sequence.

CF-425

SWING-OUT HEAD, *Gallenkamp*, **4-place,** for 8×15 ml or 4×50 ml buckets. Mixed loads of 15 ml and 50 ml sizes may be centrifuged providing that opposing assemblies are the same. **Supplied without trunnions, buckets, cushions or tubes** ... ... Each **£12·00** *bx*

ACCESSORIES
CF-429 **Trunnions, 2-place, 15 ml,** supplied as balanced pair. Pair **£4·20** *bx*
CF-432 **Trunnions, 1 place, 50 ml,** supplied as balanced pair. Pair **£1·40** *bx*
CF-445 **Bucket, 50 ml,** stainless steel. Requires cushion CJ-320 or CJ-330 ... ... Ten **£13·00** Each **£1·45** *bx*
CF-418 **Bucket, 15 ml** ... ...
CJ-305 **Cushion,** for 15 ml bucket
CJ-320 **Cushion,** for 50 ml bucket
CJ-330 **Cushion,** for 50 ml bucket
} For details and prices see entries in List No. sequence.


CF-425
with accessories

CF-460

ANGLE HEAD, *Gallenkamp*, **6-place** for 15 ml buckets. **Supplied without buckets, cushions or tubes.** Each **£8·50** *bx*

ACCESSORIES
CF-418 **Bucket, 15 ml** ...
CJ-305 **Cushion** ... ...
} For details and prices see entries in List No. sequence.

CF-480

TACHOMETER, hand type, 13 cm long scale calibrated 0 to 5000 rev/min in white on a black dial. Complete with spindle, clockwise rotation ... Each **£12·00** *mx*

FITTING CHART for tubes and buckets see page 116.
ADAPTERS for 15 ml and 50 ml buckets see page 119.

CF-460
with accessories

Gallenkamp LABORATORY CENTRIFUGE

Maximum capacity 1000 ml.

A general purpose laboratory centrifuge suitable for a wide range of routine and research applications.

SAFETY FEATURES include:

- No start until lid closed
- Automatic lid-lock when head is spinning
- Head imbalance cut-out
- Extra strong guard ring and case

Gallenkamp
LABORATORY CENTRIFUGE

CF-590 with accessories

- Automatically controlled speed build-up
- Tachometer generator controlled speed up to 5000 rev/min
- Integral speed indicator
- Efficient brake
- Adjustable time switch with untimed run position
- Robust heavy-duty motor—efficient air cooling
- Solid-state circuitry—television interference suppressor fitted
- Swing-out and angle heads

DESIGN

A robust, powerful motor is supported on flexible mountings in a heavy gauge steel case. The head rotates inside an easily cleaned spun bowl. The bowl is surrounded by a steel cylinder and is covered by a heavy gauge double skinned lid. This robust construction will contain any debris resulting from head, trunnion or bucket failure. The flexible mounting of the motor makes accurate balancing of the load unnecessary; only visual balancing of opposing loads is normally required.

All controls are mounted on a panel conveniently placed at the front of the outer case.

The motor cannot be started until the lid has been correctly closed and, no matter what the setting of the speed controller, the initial acceleration is automatically controlled to provide a gentle build-up of the speed of the head.

The motor speed is controlled by a tachometer generator feed back, solid state, true speed controller and is indicated on a direct reading tachometer. A feature of the design is that repetitive tests at the same speed can be made without having to alter the setting of the speed control knob even if the load from one test to the next varies.

In the event of the head having been inadequately balanced during sample loading, a vibration sensing cut-out switches off the motor and applies the brake very soon after starting.

The running time may be controlled automatically by the built-in 0 to 60 minute time switch, or controlled manually by using the untimed run position of the switch.

At the end of the run, the head may be allowed to come to rest naturally as the result of friction or it may be stopped more quickly by the application, during all or part of the period, of an electric brake which remains effective right down to the standstill. With either method, an electric lock prevents the lid from being opened until the head has come to rest.

Television interference suppression is fitted.

DIMENSIONS and WEIGHT: 46×55×50 cm high; 60 kg.
POWER RATING, max.: 750W.

CF-590

CENTRIFUGE, *Gallenkamp*, as specification, maximum speed 5000 rev/min. With enclosed drive, tachometer generator speed controller, speed indicator, brake, timer with untimed run position, automatic lid lock and head imbalance cut-out. **Without heads or accessories.** For single phase supplies.

For 220/240V 50 Hz single phase supplies	Each	**£310·00**	*bx*
For 200/210V 50 Hz single phase supplies	Each	**£316·00**	*bxN*
For 110/120V 50 or 60 Hz single phase supplies	Each	**£316·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

CF-602	Carbon brushes, for motor	Pair	**£1·10**	*bx*

When ordering replacement parts please state serial number of centrifuge and supply voltage.

Gallenkamp LABORATORY CENTRIFUGE

MULTILOAD SWING-OUT HEAD

CF-610

SWING-OUT HEAD, *Gallenkamp,* **Multiload, 4-place.** For 15 ml, 50 ml and 100 ml buckets. Accepts trunnions CF-616 to CF-624. Mixed loads may be centrifuged as long as the trunnions, buckets and contents in opposing positions are paired and reasonably balanced. **Supplied without trunnions, buckets, cushions or tubes** ... ... Each **£36·50** *bx*

ACCESSORY TRUNNIONS

CF-616 **Trunnions, 4-place, 15 ml,** supplied as balanced pair. Requires eight buckets CF-418 ... ... Pair **£8·00** *bx*

CF-618 **Trunnions, 1-place, 50 ml,** supplied as balanced pair. Requires two buckets CF-445 ... ... Pair **£6·00** *bx*

CF-622 **Trunnions, 2-place, 50 ml,** supplied as balanced pair. Requires four buckets CF-445 ... ... Pair **£9·50** *bx*

CF-624 **Trunnions, 1-place, 100 ml,** supplied as balanced pair. Requires two buckets CF-636 ... ... Pair **£7·00** *bx*

ACCESSORY BUCKETS

CF-418 **Bucket, 15 ml,** stainless steel. Requires cushion CJ-305 ...

CF-445 **Bucket, 50 ml,** stainless steel. Requires cushion CJ-320 or CJ-330 ... ...

For details and prices see entries in List No. sequence.

CF-636 **Bucket, 100 ml,** stainless steel. Requires cushion CJ-340. Ten **£38·00** Each **£4·30** *bx*

CJ-305 to CJ-340 Cushions. For details and prices see entries in List No. sequence.

250 ml SWING-OUT HEAD

CF-665

SWING-OUT HEAD, *Gallenkamp,* **4-place** with 250 ml buckets. Supplied with four steel buckets CF-667 for use with bottles CJ-212. No cushions required. **Without bottles** ... ... Each **£98·00** *bx*

REPLACEMENT PARTS

CF-667 **Buckets, 250 ml,** steel, for use with bottles CJ-212. No cushions required. Supplied as balanced pair. Pair **£18·50** *bx*

ACCESSORY

CJ-212 **Centrifuge bottle,** polypropylene, 250 ml with screw cap. For price see entry in List No. sequence.

ANGLE HEADS

CF-670

ANGLE HEAD, *Gallenkamp,* **16-place,** for 15 ml buckets. **Supplied without buckets, cushions or tubes** ... ... Each **£41·50** *bx*

ACCESSORIES

CF-418 **Bucket, 15 ml,** stainless steel ... ...

CJ-305 **Cushions,** for 15 ml buckets

For details and prices see entries in List No. sequence.

CF-675

ANGLE HEAD, *Gallenkamp,* **8-place,** for 50 ml buckets. **Supplied without buckets, cushions or tubes** ... ... Each **£49·00** *bx*

ACCESSORIES

CF-445 **Bucket, 50 ml,** stainless steel ... ...

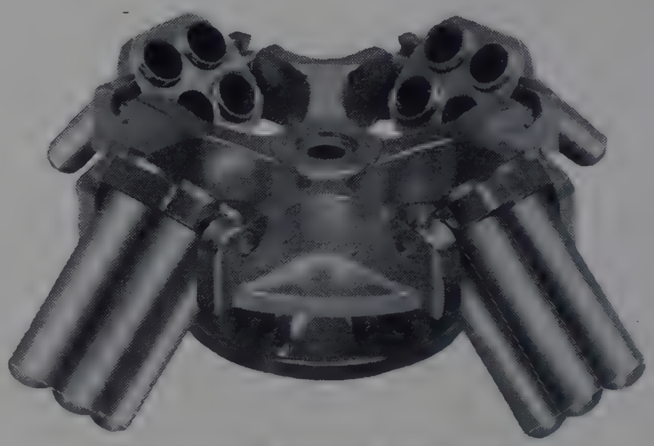
CJ-330 **Cushions,** for 15 ml buckets

For details and prices see entries in List No. sequence.

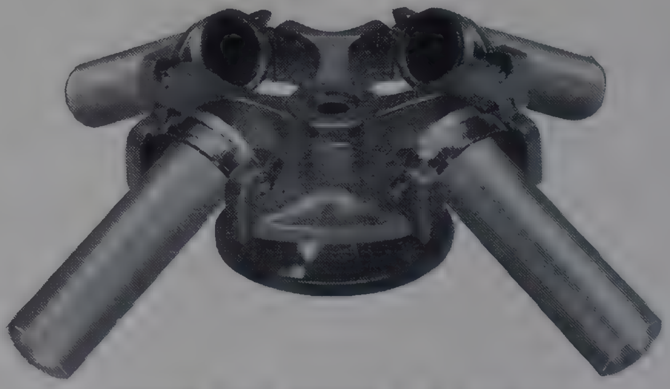
TUBES, CUSHIONS, ADAPTERS and FITTINGS CHART see pages 116 to 119.

HEAD SPEEDS AND RCF VALUES

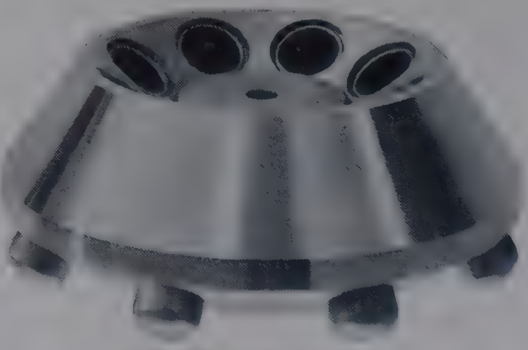
LIST No.	TYPE	LOAD No. × ml	MAX. SPEED rev/min	MAX. RCF × g
CF-610	swing-out	16 × 15	4000	2850
		4 × 50		
		8 × 50		
		4 × 100		3350
CF-665	,, ,,	4 × 250	3000	1600
CF-670	angle	16 × 15	5000	3400
CF-675	,,	8 × 50	5000	3400



CF-610 with CF-616 and buckets



CF-610 with CF-624 and buckets

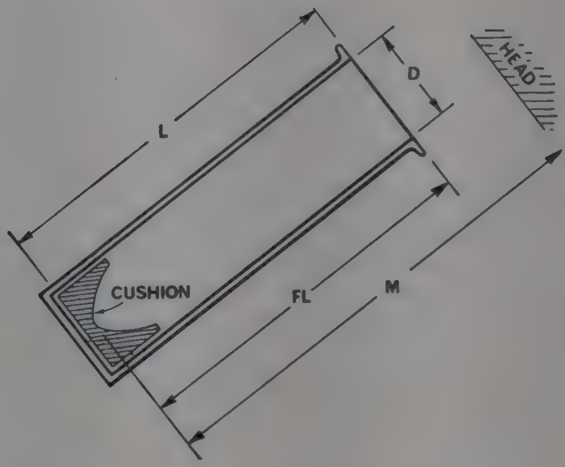


CF-675 and buckets

FLOOR STANDS for mounting centrifuge — see OV-480 et seq. in List No. sequence.

FITTING CHART FOR TUBES AND CUSHIONS

Centrifuge Model	Bucket List No.	Material	Capacity (ml)	Use cushion List No.	Dimension L (mm)	Dimension FL (mm)	Dimension D (mm)	Dimension M (mm)
CF-405	**CF-418**	Stainless steel	15	**CJ-305**	93	88	18	118
	CF-445	„ „	50	**CJ-320** **CJ-330**	95	89	30	118
CF-590	**CF-418**	Stainless steel	15	**CJ-305**	93	82	18	115
	CF-445	„ „	50	**CJ-320**	93	82	30	125
	„ „	„ „	50	**CJ-330**				
	CF-636	„ „	100	**CJ-340**	126	123	34	160
	CF-667	Steel	250	—	102	—	63	125



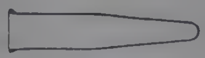
NOTE:

'M' is the maximum length of tube which can be used without fouling centrifuge head.

CENTRIFUGE TUBES

All dimensions given are nominal.

CAPACITIES 0·5 to 12 ml.



CJ-005

CJ-005

CENTRIFUGE TUBES, (AG), **conical,** borosilicate glass with rim. To BS 1428 part E3. In packs of ten.

Capacity	0·5	1	2	3 ml	
Diameter	6·3	8·5	11·25	11·25 mm	
Height	60	63	68	76 mm	
10 packs	**£12·60**	**12·60**	**14·80**	**16·00**	*ax*
Pack	**£ 1·40**	**1·40**	**1·65**	**1·80**	

CJ-012

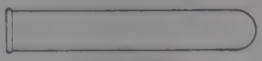
***CJ-012**

CENTRIFUGE TUBE, cylindrical, polypropylene with rim, capacity 3 ml, overall dimensions 11×76 mm.
Ten **£0·90** Each **£0·16** *mx*

CJ-015

CJ-015

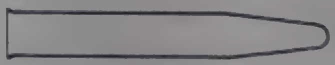
CENTRIFUGE TUBE, (AG), **conical,** borosilicate glass with rim, capacity 5 ml, overall dimensions 13·5×103 mm.
In pack of ten ... 10 packs **£14·20** Pack **£1·60** *ax*



CJ-035

***CJ-035**

CENTRIFUGE TUBE, cylindrical, polypropylene with rim, capacity 12 ml, overall dimensions 18×100 mm.
Ten **£1·00** Each **£0·17** *mx*



CJ-038

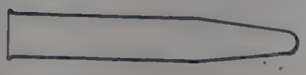
***CJ-038**

CENTRIFUGE TUBE, conical, *Corex* glass with rim, medium speed, capacity 12 ml, overall dimensions 17×120 mm ... ... 24 **£25·00** Each **£1·20** *mx*

For information on *Corex* tubes see page 118.

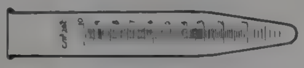
CENTRIFUGE TUBES

CAPACITY 15 ml.



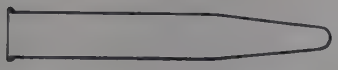
CJ-040

CJ-040
CENTRIFUGE TUBE, conical, soda-lime glass with rim, capacity 15 ml, overall dimensions 17×111 mm.
In pack of ten ... 10 packs **£6·80** Pack **£0·76** *cx*



CJ-042

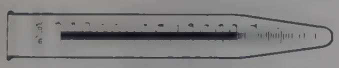
***CJ-042**
CENTRIFUGE TUBE, conical, soda-lime glass with rim, capacity 15 ml, graduated 10 cm³ in 0·1 cm³. Overall dimensions 17×111 mm. In pack of ten.
10 packs **£24·00** Pack **£2·65** *cx*



CJ-043 CJ-044

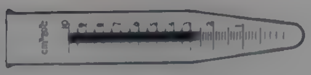
† *CJ-043
CENTRIFUGE TUBE, conical, *Corex* glass with rim, low speed, capacity 15 ml, overall dimensions 17×120 mm.
30 **£21·00** Each **£0·82** *mx*

CJ-044
CENTRIFUGE TUBE, conical, borosilicate glass with rim, capacity 15 ml, overall dimensions 17×111 mm. In pack of ten ... 10 packs **£11·00** Pack **£1·25** *cx*



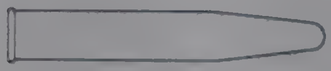
CJ-045

† *CJ-045
CENTRIFUGE TUBE, conical, *Corex* glass with rim, low speed, capacity 15 ml, graduated 15 cm³ in 0·1 cm³, overall dimensions 17×120 mm.
18 **£42·00** Each **£2·70** *mx*



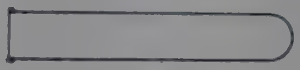
CJ-046

CJ-046
CENTRIFUGE TUBE, conical, *Pyrex* glass with rim, capacity 15 ml, graduated in 0·1 cm³ up to 3 cm³ and 0·5 cm³ from 3 to 10 cm³, overall dimensions 17×110 mm.
48 **£20·15** Each **£0·50** *jx*



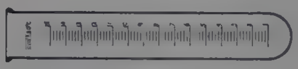
CJ-048

CJ-048
CENTRIFUGE TUBE, conical, polypropylene with rim, capacity 15 ml, overall dimensions 16×110 mm.
In pack of 10 ... 10 packs **£4·00** Pack **£0·45** *cx*



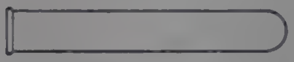
CJ-050

CJ-050
CENTRIFUGE TUBE, (AG), **cylindrical,** soda-lime glass with rim, capacity 15 ml, overall dimensions 17×111 mm. In pack of ten.
10 packs **£6·60** Pack **£0·74** *ax*



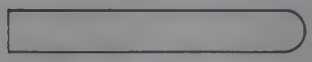
CJ-052

CJ-052
CENTRIFUGE TUBE, *Technico,* **cylindrical,** soda-lime glass with rim, capacity 15 ml, graduated 1 to 15 cm³ in 0·2 cm³, overall dimensions 17×111 mm. With permanent graduations and inscriptions in amber stain.
Ten **£3·60** Each **£0·42** *ax*



CJ-055

***CJ-055**
CENTRIFUGE TUBE, cylindrical, polypropylene with rim, capacity 15 ml, overall dimensions 16×115 mm.
Ten **£1·90** Each **£0·26** *cx*



CJ-057 CJ-060

† *CJ-057
CENTRIFUGE TUBE, cylindrical, *Corex* glass, rimless, low speed, capacity 15 ml, overall dimensions 16×116 mm ... ... 48 **£25·50** Each **£0·64** *mx*

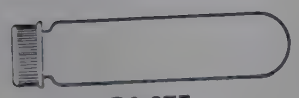
† *CJ-060
CENTRIFUGE TUBE, cylindrical, *Corex* glass, rimless, high speed, capacity 15 ml, overall dimensions 17×103 mm. For high speed usage must be used with adapter CJ-061 in larger bucket.
48 **£25·50** Each **£0·64** *mx*

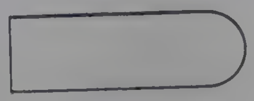
ACCESSORY
***CJ-061** **Adapter,** rubber, for CJ-060. Overall dimensions 29×102 mm ... 12 **£11·00** Each **£1·04** *mx*

† *Corex* **tubes—see information on page 118.**

CENTRIFUGE TUBES

CAPACITIES 20 to 45 ml.

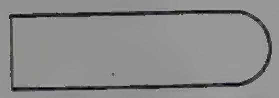

CJ-075


CJ-076

***CJ-075**

CENTRIFUGE TUBE, cylindrical, *Corex* glass, high speed, with screw cap, capacity 25 ml, overall dimensions 24×109 mm. For high speed usage must be used with adapter CJ-076 in a larger bucket.
12 **£27·00** Each **£2·55** *mx*

ACCESSORY
***CJ-076** **Adapter,** rubber, for CJ-075. Overall dimensions 29×92 mm ... 12 **£12·00** Each **£1·12** *mx*


CJ-082 CJ-083

***CJ-082**

CENTRIFUGE TUBE, cylindrical, *Corex* glass, high speed, rimless, capacity 30 ml, overall dimensions 23×105 mm. For high speed usage must be used with adapter CJ-083 in a larger bucket.
36 **£38·00** Each **£1·25** *mx*

ACCESSORY
***CJ-083** **Adapter,** rubber, for CJ-082. Overall dimensions 29×102 mm ... 12 **£11·80** Each **£1·10** *mx*

CJ-090

***CJ-090**

CENTRIFUGE TUBE, conical, *Corex* glass, low speed, with pouring lip, capacity 40 ml, overall dimensions 29×118 mm ... ... 12 **£19·00** Each **£1·80** *mx*

COREX Centrifuge Tubes

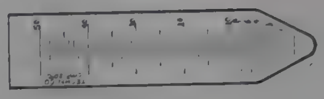
These tubes are made in the U.S.A. from a special type of glass which is treated by an ion-exchange process to increase its strength and surface hardness. They withstand repeated steam sterilisation without visible clouding and may be used up to 300°C without damage. They are especially recommended for use where the safety of samples is an important consideration.

Low speed tubes are suitable up to 4500 g, medium speed tubes up to 15,000 g and the high speed tubes may safely be spun up to 40,000 g.

Fittings chart for tubes and buckets—see page 116.

CAPACITY 50 ml.

CJ-100

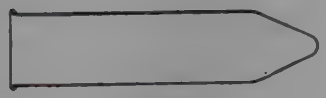

CJ-102

CJ-100

CENTRIFUGE TUBE, Ⓐ, **conical,** soda-lime glass, rimless, capacity 50 ml, overall dimensions 29×118 mm.
Ten **£1·55** Each **£0·23** *ax*

CJ-102

CENTRIFUGE TUBE, *Technico,* **conical,** soda-lime glass, rimless, capacity 50 ml, graduated 50 cm³ in 1 cm³, overall dimensions 29×118 mm. With permanent graduations and inscriptions in amber stain.
Ten **£7·60** Each **£0·84** *ax*


CJ-110

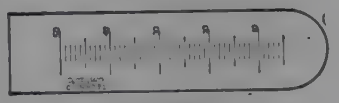
CJ-112

***CJ-110**

CENTRIFUGE TUBE, conical, *Corex* glass with rim, low speed, capacity 50 ml, overall dimensions 28×135 mm.
30 **£34·00** Each **£1·35** *mx*

***CJ-112**

CENTRIFUGE TUBE, conical, *Corex* glass with rim, low speed, capacity 50 ml, graduated in 0·5 cm³ up to 10 cm³ and 1 cm³ from 10 to 50 cm³, overall dimensions 28×135 mm. ... ... 12 **£35·00** Each **£3·30** *mx*


CJ-122

CJ-124

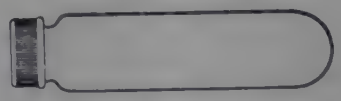
CJ-122

CENTRIFUGE TUBE, *Technico,* **cylindrical,** soda-lime glass, rimless, capacity 50 ml, graduated 50 cm³ in 1 cm³, overall dimensions 29×118 mm. With permanent graduations and inscriptions in amber stain.
Ten **£8·20** Each **£0·92** *ax*

CJ-124

CENTRIFUGE TUBE, Ⓐ, **cylindrical,** borosilicate glass, rimless, capacity 50 ml, overall dimensions 29×118 mm ... ... Ten **£1·55** Each **£0·23** *ax*

CJ-138


CJ-150

CJ-138

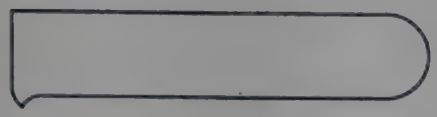
CENTRIFUGE TUBE, cylindrical, polypropylene, rimless, capacity 50 ml, overall dimensions 29×111 mm.
Ten **£3·40** Each **£0·40** *cx*

***CJ-150**

CENTRIFUGE TUBE, cylindrical, *Corex* glass, low speed, with screw cap, capacity 50 ml, overall dimensions 28×125 mm ... ... 12 **£32·00** Each **£3·00** *mx*

CENTRIFUGE TUBES AND BOTTLES

TUBE
CAPACITY 100 ml



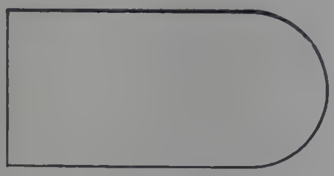
CJ-160

CJ-160

CENTRIFUGE TUBE, cylindrical, borosilicate glass, with pouring lip, capacity 100 ml, overall dimensions 33×160 mm ... ... Ten **£2·95** Each **£0·36** *mx*

BOTTLES

CJ-190



CJ-191

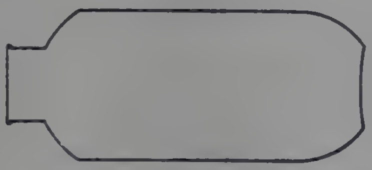
† *CJ-190

CENTRIFUGE BOTTLE, *Corex* glass, with polypropylene screw cap, medium speed, capacity 150 ml, overall dimensions 52×136 mm. Must be used with adapter CJ-191 in a larger bucket.
Six **£35·00** Each **£6·40** *mx*

ACCESSORY

***CJ-191** **Adapter,** rubber, for CJ-190. Overall dimensions 61×122 mm ... Six **£15·50** Each **£2·80** *mx*

† See information on page 118.



CJ-210

CJ-210

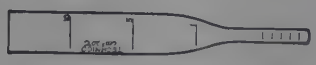
CENTRIFUGE BOTTLE, *Pyrex* glass, with neck, capacity 210 ml, overall dimensions 61×145 mm.
24 **£10·25** 12 **£5·30** *jx*
Each **£0·49**

CJ-212

***CJ-212**

CENTRIFUGE BOTTLE, polypropylene, with screw cap, capacity 250 ml, overall dimensions 61×125 mm.
Each **£0·90** *cx*

SPECIAL PURPOSE TUBES



CJ-220

CJ-220

CENTRIFUGE TUBE, *Technico*, Hopkins vaccine, graduated 0 to 0·05 in 0·01 cm³ and marks at 1, 5 and 10 cm³, overall dimensions 17·5×117 mm. With permanent graduations and inscriptions in amber stain.
Ten **£7·20** Each **£0·80** *ax*

DC-030 et seq.	**Gerber tubes**	For details and prices see entries in List No. sequence.
FD-480	**Filter holder,** *Hemmings* ...	
FD-643	**Filter tube,** *SintAGlass*	
MC-700	**Wintrobe tube to BS 4316** ...	
NR-630	**Digestion/centrifuge tube** ...	
PH-912	**Water and sediment tube to** ASTM D1796-IP75	

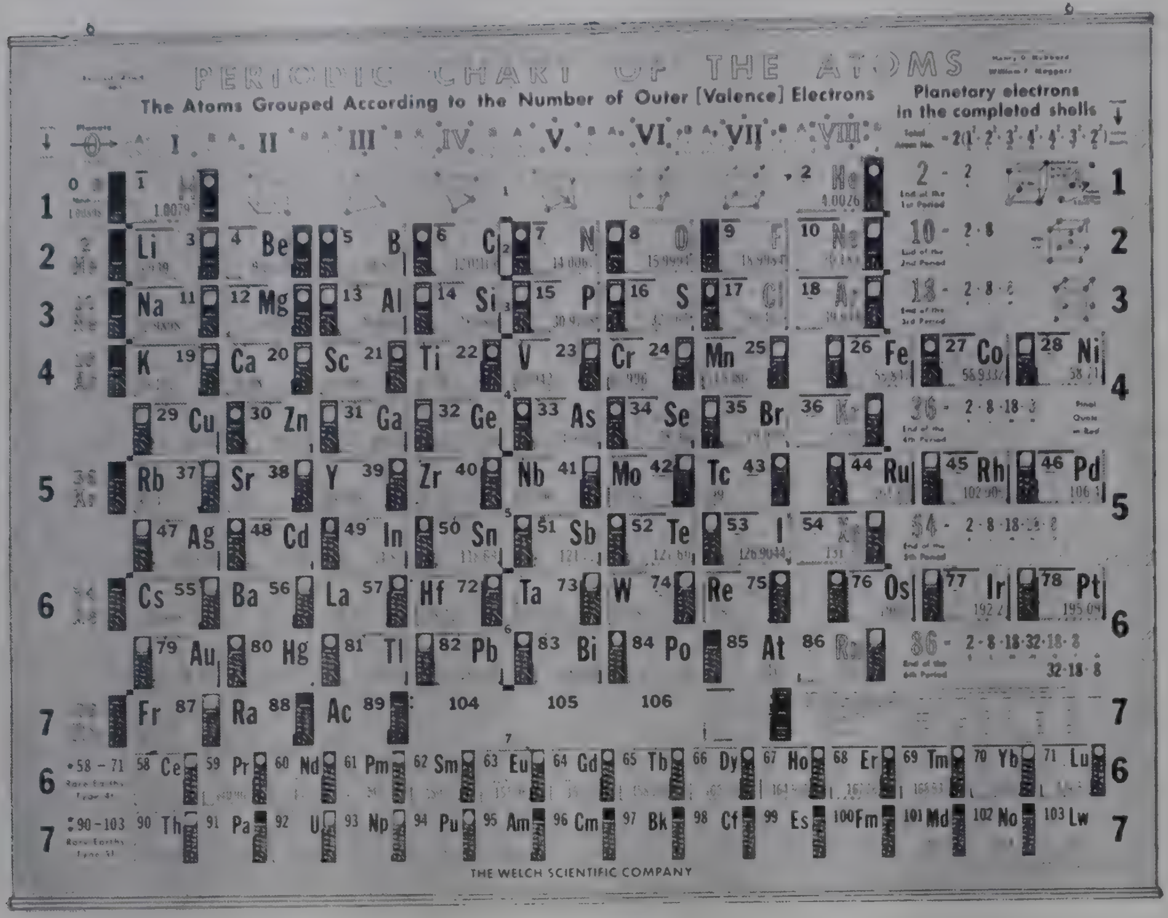
RUBBER CUSHIONS

		Pack of Ten	
		£	
CJ-305	For 15 ml buckets	0·50	bx
CJ-320	For 50 ml buckets when using round bottom tubes	1·25	bx
CJ-330	For 50 ml buckets when using short conical tubes CJ-100 and CJ-102 only	1·60	bx
CJ-335	For 50 ml bucket when using universal container CX-230	1·50	bx
CJ-340	For 100 ml buckets	1·25	bx

EBONITE ADAPTERS

		Pair	
		£	
CJ-402	For using tubes CJ-005 and CJ-012 in 15 ml buckets. Supplied as balanced pair	5·70	bx
CJ-410	For using 5 ml tubes CJ-015 in 15 ml buckets. Supplied as balanced pair	3·10	bx
CJ-420	For using Wintrobe tube MC-700 in 15 ml buckets. Supplied as balanced pair	3·10	bx
CJ-430	For using 15 ml tubes in 50 ml buckets. Supplied as balanced pair	4·30	bx

Fitting chart for tubes and buckets—see page 116.


PERIODIC CHART OF THE ATOMS
The Atoms Grouped According to the Number of Outer [Valence] Electrons
Planetary electrons in the completed shells
THE WELCH SCIENTIFIC COMPANY

CJ-900

CHARTS

***CJ-900**

PERIODIC CHART of the ATOMS, Meggers, originally designed by H. D. Hubbard of the American National Bureau of Standards. A large multi-coloured chart, 110 × 150 cm wide, printed on heavy paper finished with matt plastics protective surface, with metal rims at top and bottom and eyelets for hanging. Clearly presents the principal facts of all known elements and their atoms; recently discovered transuranic elements are included. In each case atomic number, atomic weight and symbol are shown in large display type, and in most cases some thirty other items of information are given. The chart is supplied with a 48-page explanatory booklet containing further useful information ... Each **£8·25** cz

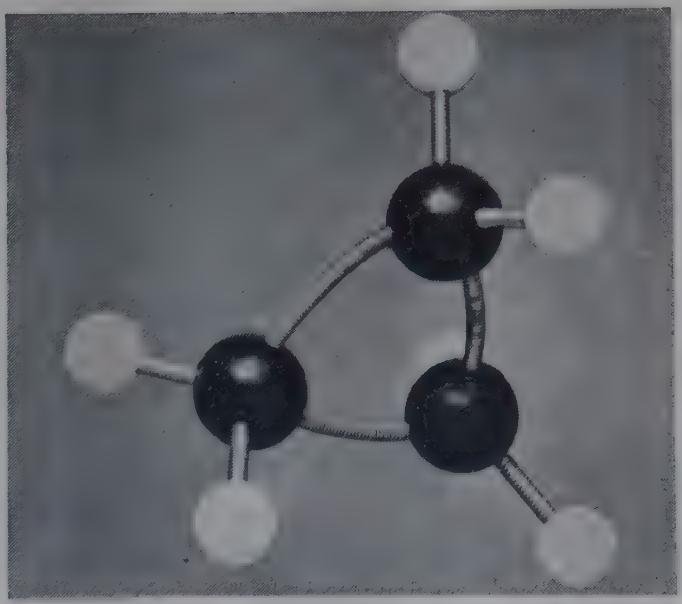
Gallenkamp MOLECULAR MODELS

REGD. TRADE MARK

For Inorganic Chemistry · Organic Chemistry · Crystallography

- **Theoretical explanations clearly illustrated**
- **Teaching simplified; maximum student comprehension achieved**

LINNELL Models

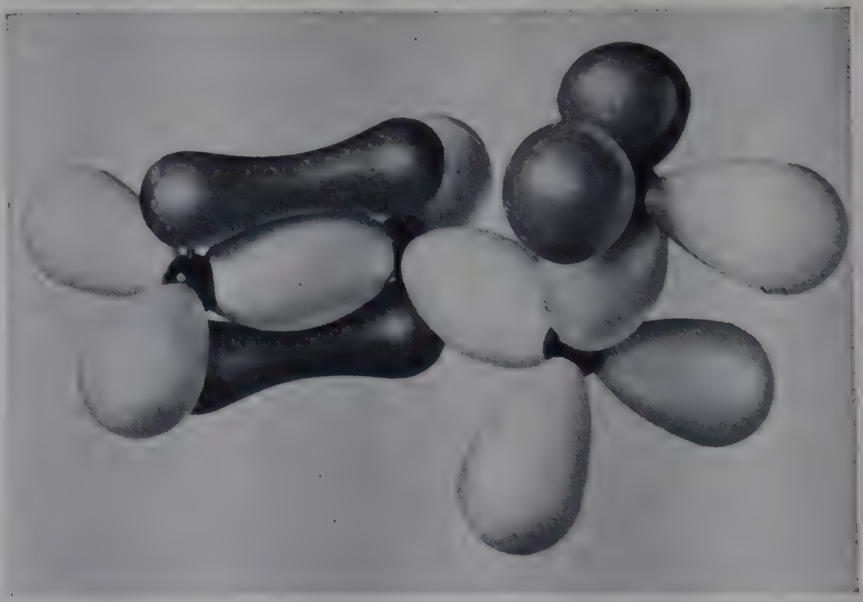


Model of cyclopropane showing:

atomic centre positions
electron band axes
molecular excitations

For details see MV-800 et seq. in List No. sequence.

PEEL Models



Model of propenol showing:

molecular orbitals
sigma and pi-bonds
steric effects

For details see MV-900 et seq. in List No. sequence.

CHROMATOGRAPHY

SECTION INDEX

PAPER CHROMATOGRAPHY

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UV lamps for examination of chromatograms—see **LAMPS**

Drying ovens, maximum temperature 300°C—see **OVENS**

PAPER CHROMATOGRAPHY

CK-180

CHROMATOGRAPHY TANK, glass. For ascending, descending and two-dimensional paper chromatography when solvent vapours preclude the use of metal or other corrodible materials. With recessed shoulders for the twin solvent troughs and glass support rods. Additional recesses are provided for rods over which paper sheets may be draped to accelerate equilibrium. The rims and glass covers are ground to provide an airtight fit with greasing and the covers are drilled with two solvent filling holes. Internal dimensions 30 × 20 × 56 cm high. Includes two glass troughs with 29 cm usable length, two glass anchor rods, four anti-siphon glass rods, two drape paper rods, glass cover and twelve plastics stoppers.
Each **£47·30** *fx*

CK-182

CHROMATOGRAPHY TANK, as CK-180 but internal dimensions 51 × 20 × 56 cm high and with troughs having 50 cm usable length ... ... Each **£67·75** *fx*

REPLACEMENT PARTS

CK-187	**Trough,** for CK-180	Each	**£3·05**	*fx*
CK-188	**Trough,** for CK-182	Each	**£4·80**	*fx*

CK-280

HOT AIR BLOWER, portable, for general drying purposes including chromatography papers. Output 300 litres/min air at 95°C. Blower incorporates a 50W universal motor and a 500W heating element with interlocking safety switches for hot or cold air. Complete with 3-core mains lead.

For 200/250V a.c. supplies	Each	**£15·00**	*mx*
For 100/110V a.c. supplies	Each	**£15·90**	*fxN*

REPLACEMENT PARTS

CK-282	**Heating element,** 500W	Each	**£1·60**	*mx*
CK-284	**Brushes,** for motor	Set	**£0·40**	*mx*

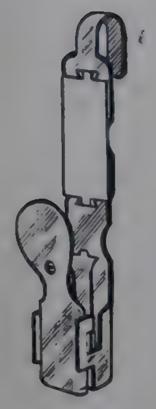
When ordering replacement parts please state supply voltage.

CK-180
CK-182

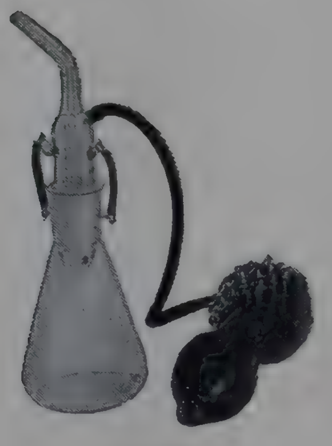
CK-280

PAPER CHROMATOGRAPHY

(continued)



CK-300



CK-318

CK-300

DRYING CLIPS, stainless steel, with white plastics label, for holding chromatography paper when drying. In pack of ten... ... 10 packs **£24·50** Pack **£2·70** *cx*

CK-318

ALL-GLASS SPRAY, for producing a fine even aerosol of chromatography reagents and dyes. Comprises spray head, 100 ml conical flask, rubber blowball and two spring connectors... ... ... Each **£5·10** *cx*

REPLACEMENT PARTS

CK-320	**Spray head, with 24/29 cone**	Each	**£3·30**	*cx*
CK-322	**Flask, 100 ml, with horns**	Each	**£0·75**	*ax*
JR-140	**Spring connectors, 38 mm, stainless steel**	For prices see entries in List No. sequence.		
RV-050	**Blowball, with reservoir, size 50×75 mm...**			

PM-546

MICROPIPETTES, Kirk pattern, capacities 5 to 100 lambda.

TR-120

STOPCLOCK, 60 minutes total.

For details of the above see entries in List No. sequence.

Gallenkamp DRYING OVENS

REGD. TRADE MARK

Gallenkamp

Two economically priced ovens with good ventilation and temperature control, suitable for paper and other drying. Aluminium interiors with wide shelves. Maximum operating temperature 200°C.

See OV-010.

A large capacity cabinet with toughened glass doors for rapid, controlled drying of chromatography sheets up to 58×68 cm. Optional exhaust fan for rapid removal of moisture and vapours. Maximum operating temperature 120°C.

See OV-880.

For details see entries in List No. sequence.

WHATMAN CHROMATOGRAPHY PAPERS

CK-510

CHROMATOGRAPHY PAPER, Grade 1, for qualitative work in one and two dimensional separations. With a medium flow rate. Supplied in packs of 100 sheets.

Size	46 × 57	58 × 68 cm	
Pack	**£2·50**	**3·61**	*mx*

CK-515

CHROMATOGRAPHY PAPER, Grade 1, as CK-510, but supplied in 100 metre roll 5 cm wide.
Each **£0·62** *mx*

CK-525

CHROMATOGRAPHY PAPER, Grade 3, a rough thick paper with a medium flow rate, suitable for inorganic and electrophoretic separations. Supplied in packs of 100 sheets.

Size	46 × 57	58 × 68 cm	
Pack	**£6·00**	**9·00**	*mx*

CK-530

CHROMATOGRAPHY PAPER, Grade 3MM, a soft smooth, thick paper, suitable for inorganic separations and where large quantities of test solution are to be analysed. Supplied in packs of 100 sheets.

Size	46 × 57	58 × 68 cm	
Pack	**£5·06**	**7·40**	*mx*

CK-535

CHROMATOGRAPHY PAPER, Grade 3MM, as CK-530, but supplied in 100 metre roll 5 cm wide.
Each **£1·08** *mx*

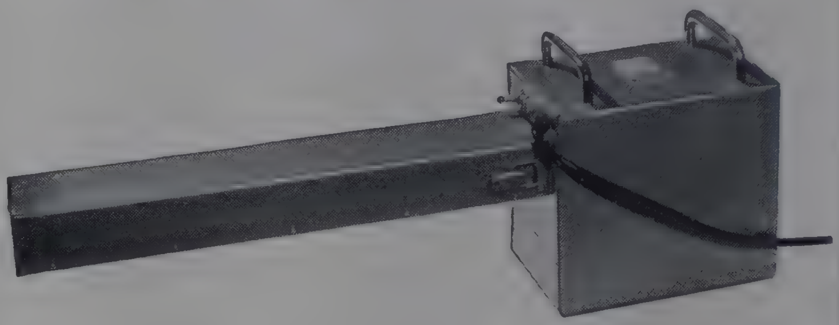
CK-540

CHROMATOGRAPHY PAPER, Grade 4, a faster running paper than Grade 1 but of the same thickness. Ensures fast development times when using slow running solvents and suitable for the analysis of amino acids and sugars. Supplied in packs of 100 sheets.

Size	46 × 57	58 × 68 cm	
Pack	**£3·78**	**5·78**	*mx*

CK-580

CHROMATOGRAPHY PAPER, Grade 54, a hardened version of Grade 4, of high wet strength. Suitable for two dimensional chromatographic separations of sugars. Recommended for impregnation with absorbents such as alumina, starch and magnesia. Supplied in pack of 100 sheets, 46 × 57 cm ... ... Pack **£7·60** *mx*



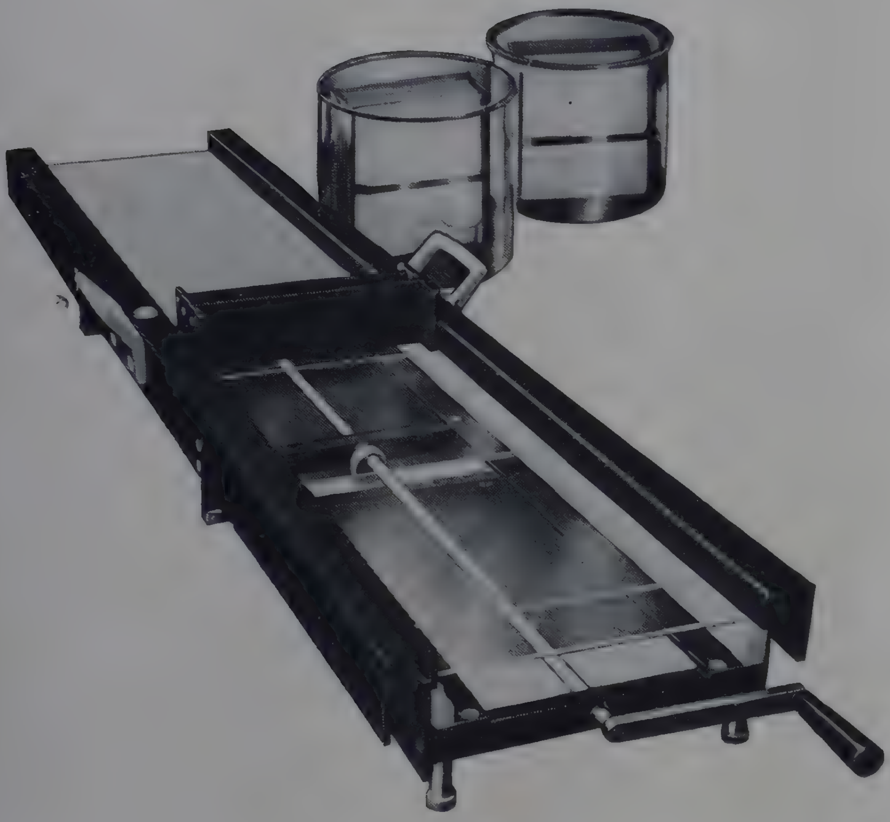
Chromatography Ultraviolet Lamp suitable for the examination of chromatograms. Designed to scan horizontally and vertically.

For details and price see LH-540 in List No. sequence.

Gallenkamp Ultraviolet Lamp, providing ultraviolet light with 95% of the radiation at 365 nm.

For details and price see LH-530 in List No. sequence.

THIN LAYER CHROMATOGRAPHY



CK-780

CK-780

T.L.C. APPARATUS, *Quickfit* **No. 8CR.** A complete outfit for carrying out thin layer chromatography experiments quickly, economically, and accurately. The outfit is designed for use with glass plates 20×20 cm which can be processed in batches of five. The spreader has four accurately machined slots for coating plates with absorbent layers 0·25, 0·5, 0·75 and 1·0 mm thick. The plastics spotting template is notched for sample application points 10 and 15 mm apart, and is ruled at 5 mm intervals for measuring Rf values on developed plates.

Outfit comprises:

Quantity	Ref. No.	Description
1	CR7/1	Automatic plate leveller
1	CR7/2	Spreader
2	CR7/3	Plate rack for plates 20×20 cm
1	CR7/4	Spotting template
1	CR7/5	Scriber
2	CR7/6	Developing tank/desiccator
2	CR7/7	Tank lid
2	CR8/5	Glass plate, 20×5 cm
2	CR8/10	Glass plate, 20×10 cm
10	CR8/20	Glass plate, 20×20 cm
1	7CR	Spray, complete, comprising spray body, flask and adapter
1	PM5/1	Micropipette, 0·005 ml subdivided 0·001 ml
1	PM10/2	Micropipette, 0·010 ml subdivided 0·0025 ml
1		Sample pack of Chromedia cellulose powder CC41

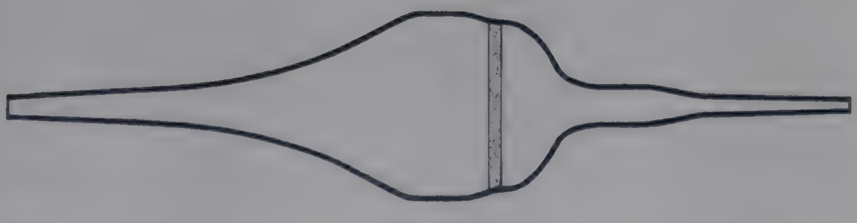
Each **£91·80** *fx*

REPLACEMENT PARTS

CK-784	**Automatic plate leveller** CR7/1 ...	Each	**£57·00**	*fx*
CK-785	**Spreader** CR7/2	Each	**£7·16**	*fx*
CK-787	**Rack,** CR7/3, for plates 20×20 cm ...	Each	**£6·47**	*fx*
CK-789	**Spotting template,** CR7/4	Each	**£2·06**	*fx*
CK-791	**Developing tank/desiccator,** CR7/6...	Each	**£8·15**	*fx*
CK-792	**Tank lid,** CR7/7	Each	**£1·03**	*fx*
CK-794	**Plate,** 20×5 cm, 82CR (CR8/5)...	Pack of 20	**£1·87**	*fx*
CK-795	**Plate,** 20×10 cm, 84CR (CR8/10)	Pack of 20	**£2·54**	*fx*
CK-796	**Plate,** 20×20 cm, 84CR (CR8/20)	Pack of 10	**£1·76**	*fx*
CK-798	**Micropipette,** 0·005 ml, PM5/1 ...	Each	**£1·11**	*fx*
CK-799	**Micropipette,** 0·010 ml, PM10/2 ...	Each	**£1·11**	*fx*
CK-801	**Spray, complete,** 7CR, comprising spray body, flask and adapter	Each	**£3·00**	*fx*
CK-802	**Spray, head only,** CR7/9	Each	**£1·45**	*fx*

SPOT COLLECTOR FUNNEL

AG
REGD



CK-850

CK-850

SPOT COLLECTOR FUNNEL (AG). An aerodynamically shaped bulb in borosilicate glass with a porosity 3 sintered disk sealed across the centre. A vacuum line is attached to one end of the bulb and the other end is used, rather like a pen, to scrape the spot from the plate. The powder is sucked into the collector and deposited on the sintered disk. After removing the air line, the powder can be rinsed out into a suitable container for UV or spectrophotometric analysis. Overall length 20 cm, plate diameter 40 mm ... Each **£3·80** *ax*

COLUMN CHROMATOGRAPHY

AG CHROMATOGRAPHY COLUMNS
Regd.

CL-100

CHROMATOGRAPHY COLUMNS, AG, borosilicate glass. A range of glass columns for gravity elution. Each column is fitted with a sintered glass support disk of porosity 1 at the lower end, and has a 19/26 socket with spring hooks for dropping funnels to be attached at the upper end.

Length	40	40	40	80 cm	
Diameter	1·0	2·0	3·0	2·0 cm	
Ten	**£19·50**	**23·00**	**28·00**	**33·00**	*ax*
Each	**£ 2·20**	**2·55**	**3·10**	**3·70**	

CL-102

CHROMATOGRAPHY COLUMN, AG, borosilicate glass, as CL-100, length 40 cm, dia. 3 cm **but with a fused-on water jacket** ... ... Each **£6·50** *ax*

CL-120

CHROMATOGRAPHY COLUMN, AG, borosilicate glass, for gravity elution. Surmounted by a 50 ml reservoir with a 14/15 socket for ground glass stopper and having a straight-bore stopcock. Int. dia. 10 mm, length 18 cm.
Ten **£28·00** Each **£3·10** *ax*

CL-130

CHROMATOGRAPHY COLUMN, AG, borosilicate glass, for suction elution, particularly suitable for separations of methylated oestrogens. Surmounted by a 40 ml reservoir and with a sintered disk, porosity 4, fused into the lower end to support the column packing. A 19/26 cone with pump connection surrounds the delivery tube and allows the elutriate to be collected in flasks having 19/26 sockets. Int. dia. 10 mm, length 50 mm ... ... Ten **£28·00** Each **£3·10** *ax*

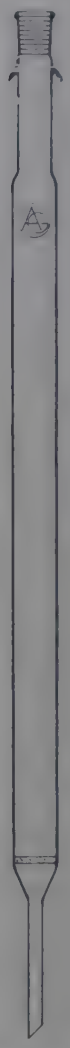
CL-140

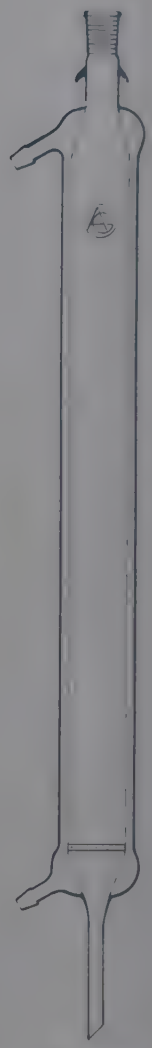
CHROMATOGRAPHY COLUMNS, AG, borosilicate glass, for pressure elution. The jacketed columns have an effective length of 40 cm and are terminated by screw joints with ptfe inserts for connection to glass or metal tubing.

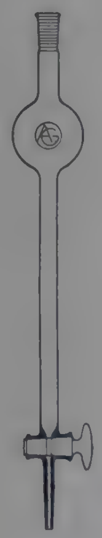
Diameter (internal)	11·5	16·5 mm	
Diameter through screw thread	7 to 8·5	10 to 11·5 mm	
Ten	**£28·50**	**37·00**	*ax*
Each	**£ 3·20**	**4·10**	

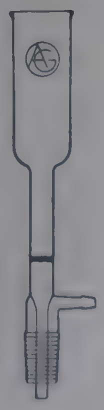
Porous polythene sheet, for use as support plates in chromatography columns—see PP-630 in List No. sequence.

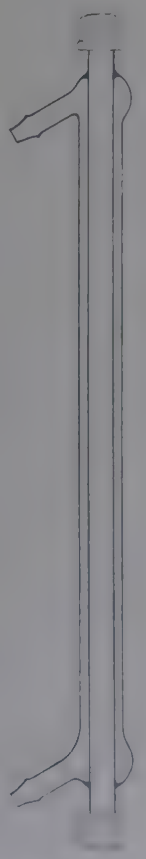
Peristaltic pumps, for use with chromatography columns—see WM-200 et seq. in List No. sequence.


CL-100


CL-102

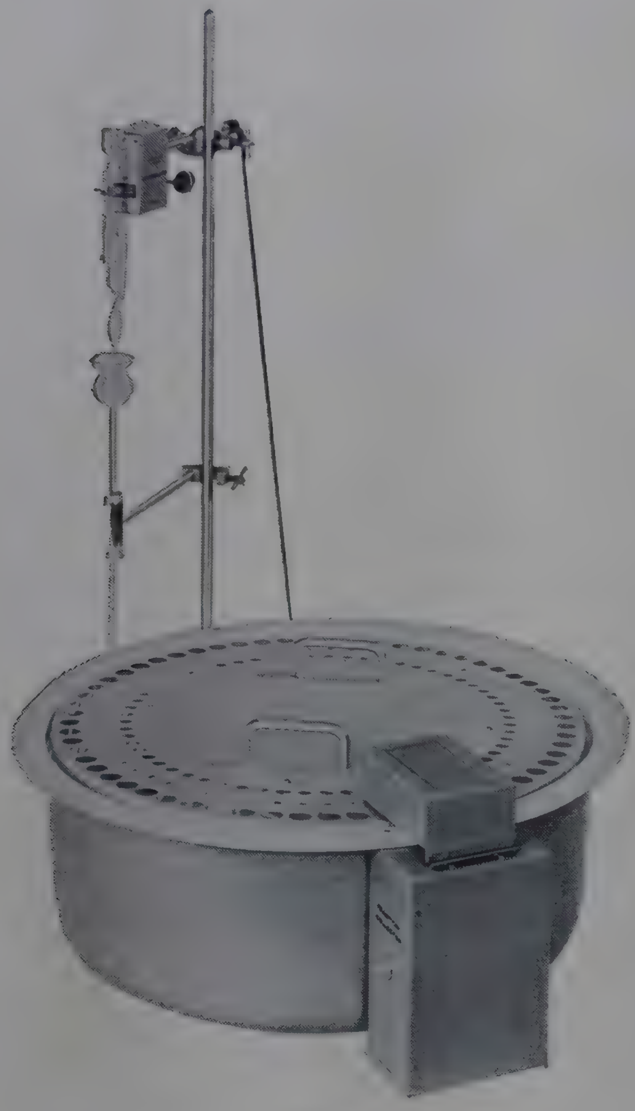

CL-120


CL-130


CL-140

Gallenkamp FRACTION

A versatile, electrically safe, spillproof fraction collector which offers volumetric or timed flow fraction cutting simply by the selection of the appropriate module.



CL-270

- **Volumetric or timed flow collection**
- **Turntable accepts up to 60 fractions in either 12 mm ($\frac{1}{2}$ in) or 19 mm ($\frac{3}{4}$ in) dia. rimmed test tubes**
- **Collector plate rotated by self-locating rim drive**
- **Rim-drive mechanism operates on 24V for maximum safety**
- **Interchangeable self standing turntables can be removed and pre-loaded in seconds**
- **Bowl construction with drain cock provides large capacity for spillage and maximum tube protection.**
- **Automatic arrest at end of track with facility for warning or stopping flow of eluent**
- **Transparent rigid cover accessory to protect turntable during long collection periods**

BOWL, COLLECTOR PLATE AND DRIVE MECHANISM

Bowl construction provides exceptionally large capacity for spillage and protection for the tubes. There are no mechanisms, bearings or circuits within the bowl. The inside of the bowl is finished in chemically resistant enamel and a drain cock is fitted.

The interchangeable collector plates can be stood on any level surface without removing the sample tubes. This facility allows the user to remove one plate of filled tubes and replace it within seconds by another plate of empty tubes to continue the collection.

The rim-drive system of advancing the collector plate ensures that no electrical or mechanical damage results from interference with the drive cycle. The drive mechanism operates on a 24V supply for maximum safety.

A transparent rigid plastics dome cover which fits over the collector plate to protect the samples from dust is available as an accessory.

DIMENSIONS AND WEIGHT

Bowl diameter	60 cm
Overall height	70 cm
Weight, net	8 kg

METHODS OF FRACTION CUTTING

By Volumetric Fractions

The siphon delivers its calibrated volume by siphoning when filled. It is mounted on a balance which tilts when the siphon has half filled or half emptied. The collector plate advances by one tube each time the balance tilts during the siphon filling cycle and a logic circuit prevents its movement at any other time. Siphons with capacities from 1 to 25 ml are listed under List Nos. CL-286 and CL-288.

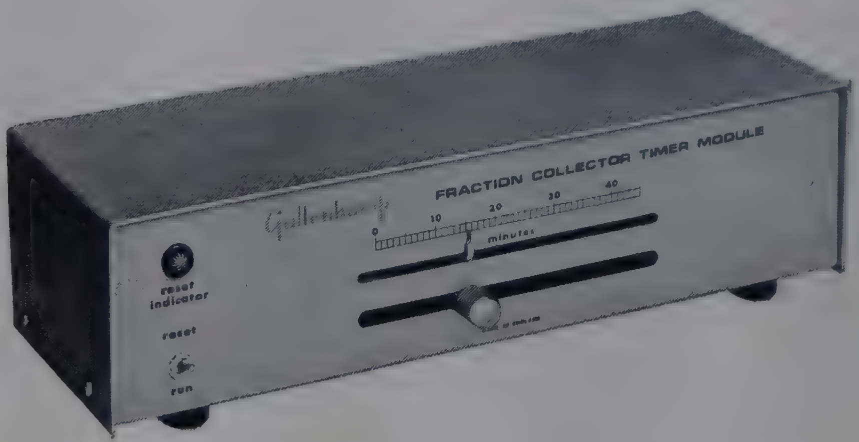
By Timed Fractions

The timer allows the eluent to flow into each tube for a predetermined time after which the collector plate advances to the next tube.

It can be set to any required interval between 1 and 45 minutes. It is fitted with a *Reset* switch which automatically returns the mechanism to zero prior to resetting the operating period. Fail-safe devices are built-in to prevent the timer damaging itself mechanically in the event of an electrical breakdown.

Timed flow permits fractions to be collected *directly off the end of the chromatography column* where this is important to reduce the effects of 'tailing', e.g. with radio-active tracer investigations.

COLLECTOR



CL-278

The design calls for the absolute minimum of maintenance and all components are readily accessible for servicing. Please note that this Fraction Collector is suitable for use only with *rimmed* test tubes.

OUTFITS

CL-270

FRACTION COLLECTOR OUTFIT, *Gallenkamp*, **for volumetric collection** comprising collector with drive assembly, collector plate for rimmed tubes, support rod, siphon balance with 5 ml aqueous siphon and bosshead, funnel with clamp and bosshead and 3 spare rubber drive wheels. For 110/120V and 200/240V 50/60 Hz single phase supplies ... ... Each **£105·00** *bx*

For other siphons see CL-286 and CL-288 in List No. sequence.

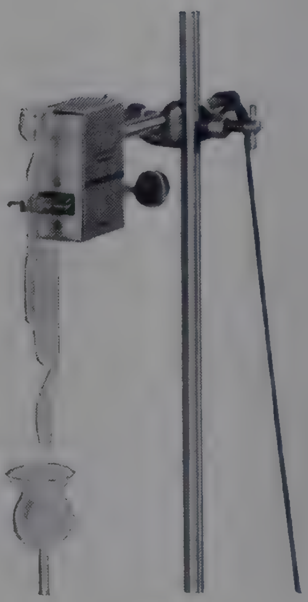
CL-272

FRACTION COLLECTOR OUTFIT, *Gallenkamp*, **for timed flow collection** comprising collector with drive assembly, collector plate for rimmed tubes, support rod, timer and 3 spare rubber drive wheels. For single phase supplies.
For 110/120V and 200/240V 50 Hz ... Each **£137·00** *bx*
For 110/120V and 200/240V 60 Hz ... Each **£138·00** *bxN*

CONVERSION KITS

CL-278

KIT TO CONVERT CL-270 to CL-272 comprising timer module. For single phase supplies.
For 110/120V and 200/240V 50 Hz ... Each **£56·00** *bx*
For 110/120V and 200/240V 60 Hz ... Each **£57·00** *bxN*



CL-280

CL-280

KIT TO CONVERT CL-272 to CL-270 comprising siphon balance with bosshead, 5 ml aqueous siphon and funnel with bosshead and clamp ... Each **£24·00** *bx*

REPLACEMENT PARTS

CL-286 **Siphons, glass,** for use with siphon balance of CL-270 and CL-280. To deliver the stated volume of aqueous solutions.

Volume	1	2·5	5	10	25 ml	
Each	**£1·55**	**1·55**	**1·55**	**1·60**	**1·70**	*ax*

CL-288 **Siphons,** as CL-286 but to deliver stated volume of non-aqueous solutions.

Volume	1	2·5	5	10	25 ml	
Each	**£1·55**	**1·55**	**1·55**	**1·60**	**1·70**	*ax*

CL-292 **Collector plate,** with 60 holes for 12 mm tubes and 60 holes for 19 mm tubes. For rimmed tubes only.
Each **£14·50** *bx*

FP-650 **Funnel,** for use with siphon balance. For details see entry in List No. sequence.

ACCESSORIES

CL-296 **Cover,** transparent rigid plastics, to protect the collector plate from dust during long collection periods.
Each **£10·00** *bx*

TF-100
TF-180
TF-184
Test tubes, rimmed, up to 150 mm long; 12 mm and 19 mm diameter.
For prices see entries in List No. sequence.

Gallenkamp COLORIMETER
REGD TRADE MARK

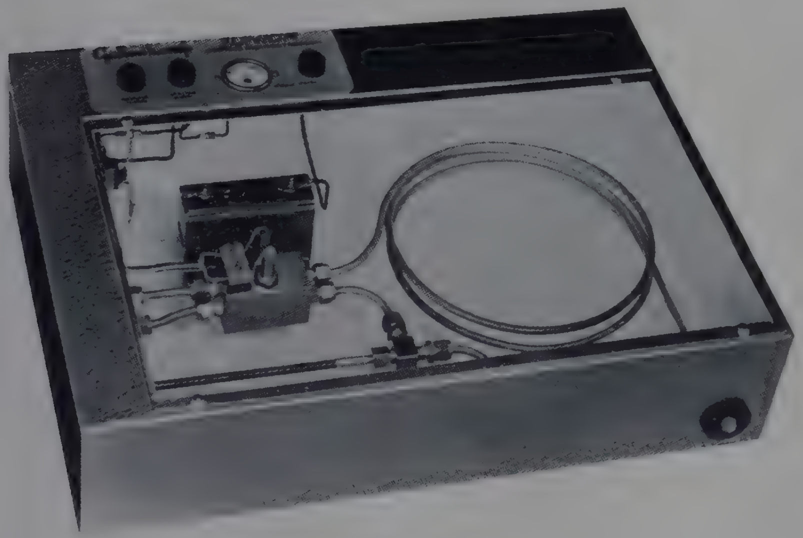
For analysis of fractions

- Rapid response—stable readings
- Simple to operate and maintain
- Reads optical density direct
- Optional flowthrough cell

For full details see CS-200 in List No. sequence.

Gallenkamp GAS CHROMATOGRAPH

- **Suitable for a wide range of routine analyses**
- **For gases and liquids with boiling points up to 80°C**
- **Battery operated—simple controls**
- **Can be used with recorder or galvanometer**
- **Produces sharply defined peaks**
- **Column and katharometer designs obviate 'tailing'**
- **Full view removable top window for easy access to components**
- **Teaching manual describing nine experiments supplied with each chromatograph**



CL-910

The *Gallenkamp* Gas Chromatograph is an efficient but simple apparatus suitable for a wide range of industrial analyses and ideal for demonstrations and individual student investigations in teaching laboratories.

As the result of careful design, the response is practically linear, undesirable effects such as tailing of peaks and zero drift have been virtually eliminated and repeatability is excellent.

Although intended for operating at room temperature the open lay-out of the components makes it simple for the user to extend the temperature range of the chromatograph by wrapping heating tapes around the column and detector.

The open lay-out, full view window and simple controls are especially useful in teaching laboratories where analyses of unknown mixtures and the effects of varying parameters are being demonstrated and studied.

Bibliography

'A programmed introduction to gas-liquid chromatography', B. Pattison. Pub: Heyden, London. 1969

DESIGN FEATURES

Sample injection is by hypodermic syringe through a replaceable silicone rubber septum.

Column. The standard apparatus incorporates a 120 cm general purpose column packed with silicone impregnated Celite. The column is connected by simple screw couplings. Unfilled columns are available with instructions for filling for special applications.

Gas Flow System. The carrier gas reference stream can be balanced to the column stream by means of the adjustable needle valve. For most purposes the two streams may be compared by bubbling their outlets into a beaker of water but flowmeters may be used when flowrates are required to be known accurately. Normally nitrogen from a cylinder with pressure regulator is used but other gases may be used if needed.

Detector. This is an accurate, robust, thermal conductivity katharometer designed to minimise base line drift and temperature sensitivity. The sensing elements are a pair of matched thermistors which are powered by a battery through a suitable control circuit.

TECHNICAL DATA

For the guidance of the prospective user, the following approximate values give satisfactory results when the chromatograph is used with a 5 mV recorder. These values do not represent the full range of the instrument and precise values will depend upon individual columns and samples.

Bridge current	5 mA
Gas flow	20 to 100 ml/min
Sample volume—Liquids	10 μl
Gases	0·5 to 1 ml
Detection limit	10^{-7} g

DIMENSIONS AND WEIGHT

	H W D
Overall	14 × 51 × 40 cm
Weight, net	7 kg

INDUSTRIAL APPLICATIONS

The apparatus may be used for basic industrial training, for routine determinations where more complex equipment is unnecessary and as a quick-check method of analysis prior to more precise determination on larger more expensive chromatographs.

EDUCATIONAL APPLICATIONS

The apparatus may be used in colleges as a simple, rapid analyser and to teach or study the important concepts of gas chromatography including:

— Retention times and volumes of organic solvents
— Effects of varying katharometer bridge currents
— Effects of varying carrier gas flow rates
— Effects of varying column lengths
— Effects of changing column packing

and for comparing the relative accuracies of peak height and peak area methods of quantitative determinations.

Gallenkamp GAS CHROMATOGRAPH

REGD. TRADE MARK

CL-910

GAS CHROMATOGRAPH, *Gallenkamp*, as specification, with thermal conductivity katharometer and control circuit, matched thermistors, 120 cm silicone filled column, needle valve, silicone rubber septum, 4·5V battery, instructions manual and teaching manual. **Without galvanometers or recorder, carrier gas pressure regulator or flowmeters** ... ... Each **£102·00** *bx*

REPLACEMENT PARTS

CL-915	**Column,** 120 cm, silicone filled... ...	Each	£3·20	*bx*
CL-921	**Thermistors,** matched pair	Pair	£31·00	*bx*
CL-924	**Battery,** *Ever Ready* No. 126, 4·5V ...	Each	£0·25	*mx*
CL-926	**Injection port seals,** silicone rubber.	Pack of 10	£0·55	*bx*
CL-928	**Teaching manual, 'Experiments in Gas Chromatography'.** Describing nine experiments to introduce the basic principles and applications of gas chromatography.	Each	£0·25	*fx*

ACCESSORIES

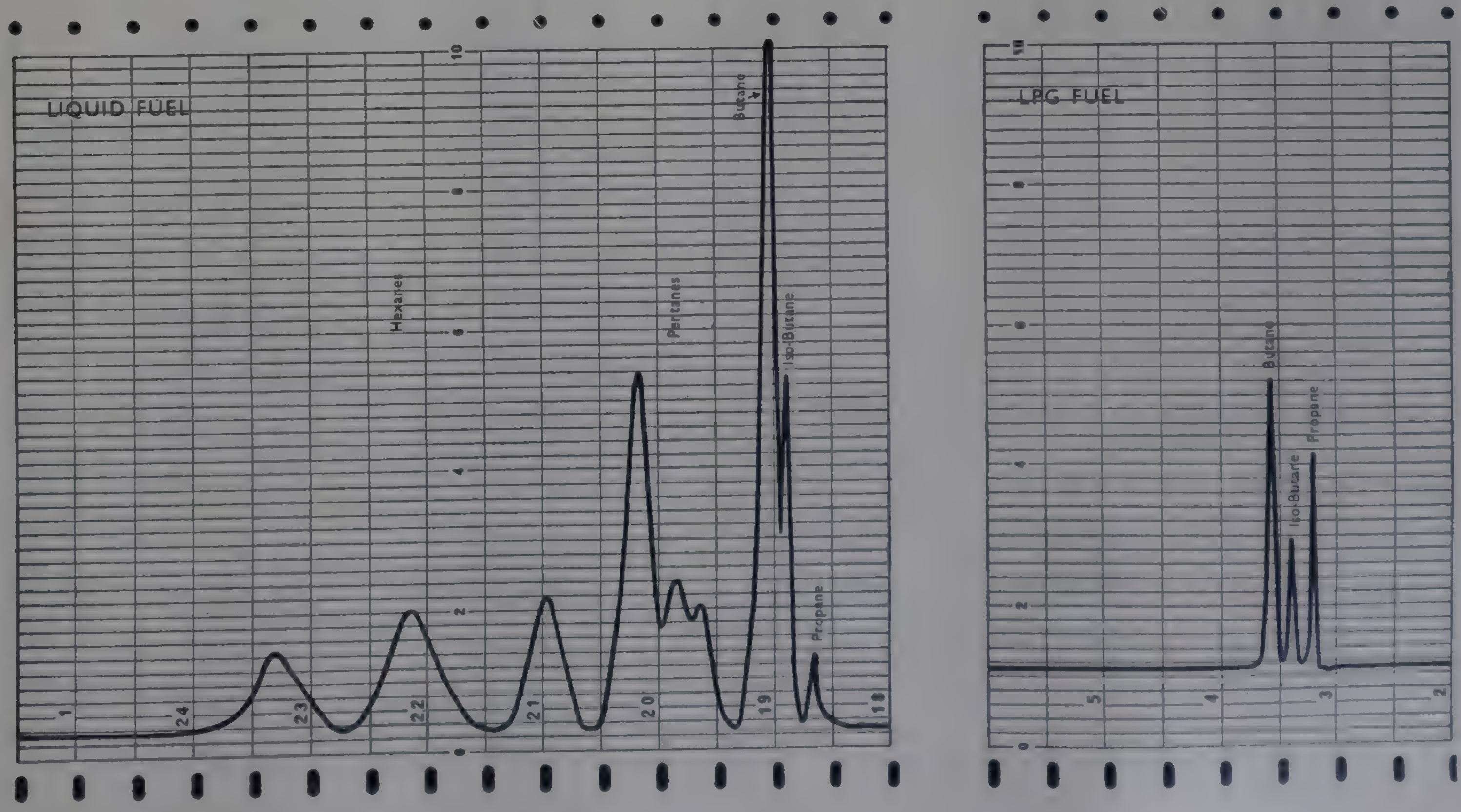
CL-930	**Columns,** unfilled, complete with couplings. Length 120 360 cm	Each	£1·95 3·80	*bx*
CL-945	**Needles,** all metal, size No. IV for use with SY-410 and SY-430	Pack of 10	£0·90	*cx*
EF-660	**Recorder,** accepts foolscap and A4 ruled or plain sheets and strip chart paper with accessory			
EF-680	**Recorder,** *Smiths Servoscribe* ...			

For details and prices see entries in List No. sequence.

FL-550	**Flowmeter,** 0–100 ml/min (2 required)
GD-530	**Pressure regulator,** variable ... ...
TX-625	**Tubing,** pressure, 6·3 mm i.d. recommended for connecting between the pressure regulator and carrier input nozzle ... ...
CP-285	**Clip,** hose, 17/13 mm recommended to ensure a gastight seal between the hose and nozzle ... ...
EF-203	**Galvanometer,** suitable for indicating the chromatograph output ... ...
SY-410	**Syringe,** 1 ml, for sample injection in work of low accuracy ... ...
SY-430	**Syringes,** plastics... ... ...
SY-500	**Microlitre syringe,** for the precise measurement of liquid samples. Capacity 50 μl, subdivided in 1 μl subdivisions. With ground fitting to accept Luer pattern needles ... ...
SY-520	**Gastight syringe,** for the introduction of precisely measured gas samples. Capacity 0·5 ml, subdivided in 0·01 ml subdivisions. With ground fitting to accept Luer pattern needles ... ...
SY-550	**Needle, syringe,** for use with SY-500 and SY-520. Luer fitting with axial point to reduce the tearing of injection port seal ... ...

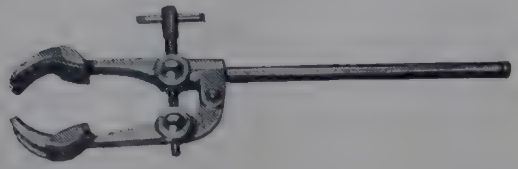
For prices see entries in List No. sequence.

Chart records obtained using the Gallenkamp Gas Chromatograph with a recorder

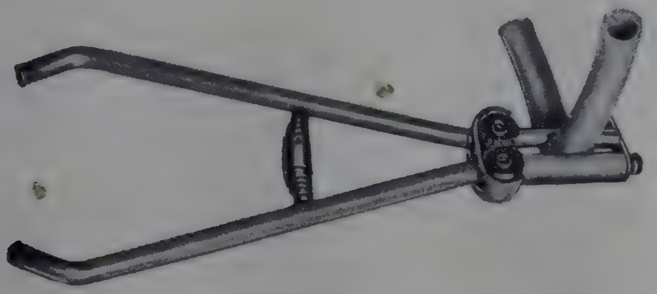


CLAMPS

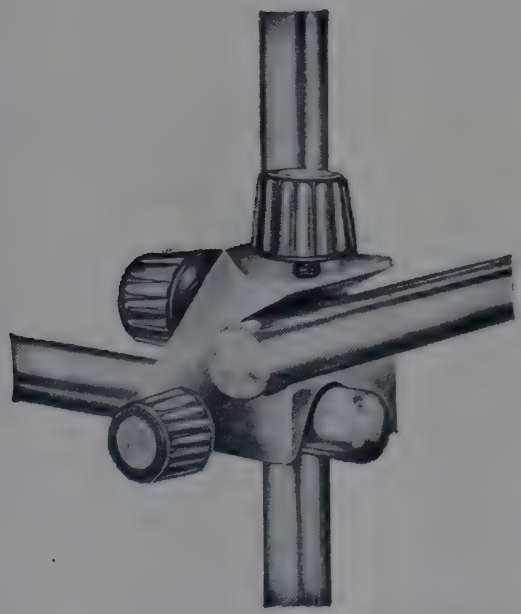
A selection of clamps listed elsewhere in this catalogue is shown below. For full details please see entries in sequence under the relevant List Nos. Other clamps and clamping devices are described on pages headed 'Stands and Clamps'.



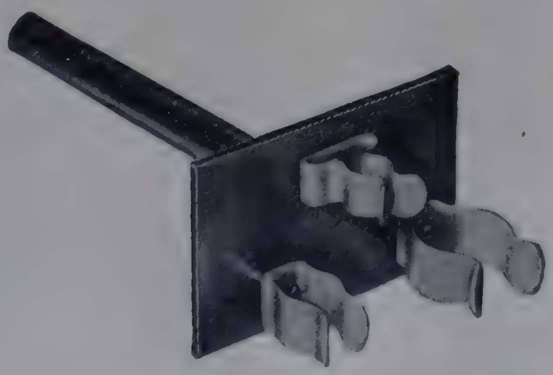
Technico clamp with finger jaws which give a firm grip on articles between 2 and 90 mm dia.—see **SM-600.**



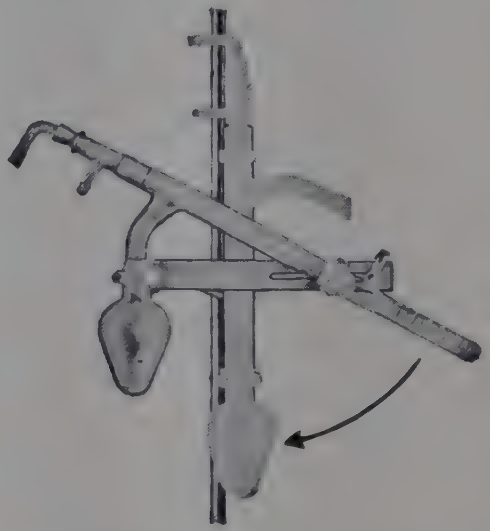
Tubing clamp easily manipulated with one hand to give drop-by-drop or continuous flow of liquid. Gives positive shut off on release—see **CX-732.**



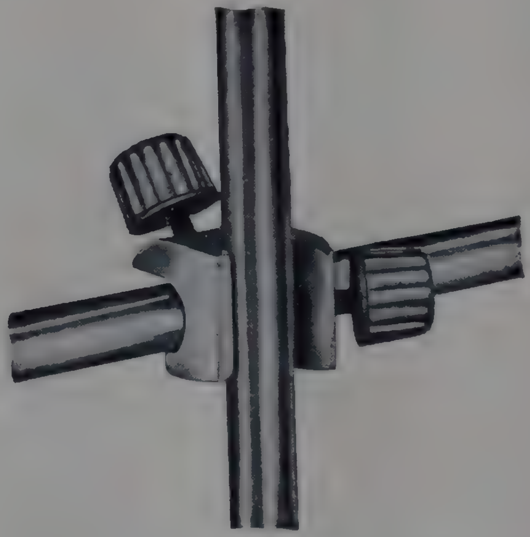
Lablox 3-way connector for clamping three rods mutually at right angles—see **SM-490.**



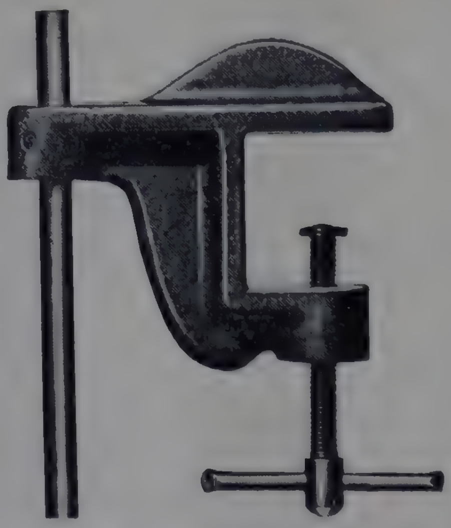
Spring clamp for supporting two electrodes and a thermometer or similar apparatus of small dia.—see **SM-683.**



Versatile semi-micro clamp for supporting small scale glass assemblies —see **SM-685.**



Lablox 2-way connector for connecting two rods at right angles—see **SM-480.**



Lablox 'G' clamp for securing rods and scaffolding assemblies to the edge of a bench—see **SM-526.**

CLOTHS AND TISSUES

CM-510

CLOTH, wiping, resin bonded cellulose fibre. Soft in texture and absorbent, these cloths may be used dry or moistened for wiping and light cleaning purposes. They will withstand careful washing. Size 50×25 cm in pack of 50 ... ... Five packs **£4·20** Pack **£0·90** *cx*

CM-520

CLOTH, glass drying, linen, 80×55 cm.
Ten **£6·00** Each **£0·66** *cx*

CM-530

CLOTH, dusting, blue check cotton, 60×60 cm.
Ten **£2·60** Each **£0·32** *cx*

CM-535

CLOTH, dusting, yellow flannelette, 45×50 cm.
Ten **£1·40** Each **£0·21** *cx*

CM-550

CLOTHS, polishing, Selvyt.

Size	25×25	47×42 cm	
Ten	**£4·00**	**10·60**	*cx*
Each	**£0·45**	**1·18**	

CM-556

CLOTH, polishing, antistatic, 35×35 cm, for dissipating electrostatic charges formed on non-conducting surfaces ... ... Ten **£3·80** Each **£0·44** *cx*

CM-560

CLOTH, swabbing, open net cloth, 55×45 cm.
Ten **£0·76** Each **£0·15** *cx*

CM-590

LEATHER, CHAMOIS, natural skin in cuts of approximately 27×30 cm ... ... Ten **£3·70** Each **£0·43** *cx*

CM-620

SPONGE, *Spontex*, absorbent cellulose, approximately 14×11×4 cm when wet ... Ten **£2·90** Each **£0·35** *cx*

CM-650

PAPER TISSUES, white, absorbent, for general laboratory use. In boxes of approx. 150 pulls, 2 ply tissue approx. 22×20 cm.
24 boxes **£2·90** 10 boxes **£1·25** *mx*
Box **£0·20**

CM-655

PAPER TOWEL. A heavy duty 2-ply paper suitable for wiping, drying and cleaning purposes. In perforated roll comprising 100 tear-off sheets, each sheet measuring approximately 45×25 cm. **Without holder.**
18 rolls **£7·60** Roll **£0·50** *cx*

ACCESSORY
CM-656 **Holder,** wall mounting, comprising roll retainer in rigid metal dust cover. Accepts one roll CM-655.
Each **£1·50** *cx*

CM-660

TISSUE, lens cleaning, *Greens* **No. 105.** 30×20 cm sheets supplied in boxes of 100.
10 boxes **£5·80** Box **£0·64** *mx*

CM-662

TISSUE, lens cleaning, *Greens* **No. 105.** In pack of 50 books. Each book contains 10 sheets 10×8 cm.
10 packs **£14·00** Pack **£1·55** *mx*

CLEANING COMPOUNDS

CM-742

CLEANER, *By-Prox*, a liquid bio-degradable detergent effective in hard, soft and salt water. Removes grease films and cleans surfaces leaving a bright finish. Supplied in polythene container, contents 1 gal (4·5 litres).
Each **£0·90** *cx*

CM-754

CLEANER, *Decon* 90 **concentrate.** A powerful, biodegradable, non-corrosive, phosphate free, general purpose laboratory surfactant with a pH of 11 in 2% solution. Will remove stubborn contaminants such as silicone and Apiezon oils and greases, polymer resins, blood, tars, cedarwood oil, Canada balsam and various other substances not removed by water, ordinary solvents or acid cleaning mixtures. Cleans glass, most metal and plastics laboratory apparatus without leaving a residue after rinsing. Solutions have no deleterious action on clothing, glass, plastics, rubber, quartz, silica or fabrics and present no disposal problems. The concentrate has anti-bacterial properties particularly suitable for use in pathology and bacteriology laboratories and tissue culture and enzymological equipment can be cleaned without fear of any temporary or cumulative toxic effects. Recommended for use with ultrasonic cleaners and for decontamination from radioactive isotopes. Supplied in plastics bottle.

Contents	1	5 kg	
Each	**£2·35**	**9·50**	*mx*

CM-760

CLEANER, for stainless steel. Cleans and polishes the surface when applied with wet cloth. Supplied in dispenser containing approx. 200 g of powder.
Each **£0·70** *cx*

POLISHES

CM-765

POLISH, wax emulsion with silicone additives and propellant. Suitable for cleaning and polishing wood and metal surfaces. In aerosol can containing approx. 400 g.
Each **£0·65** *cx*

CM-770

POLISH, wax, prepared for the preservation and polishing of laboratory bench tops and furniture. Supplied in tin containing approx. 7 lb (3 kg) ... Each **£1·40** *cx*

CM-775

POLISH, wax, with silicone additive for extra protection of polished wooden surfaces. Supplied in tin containing approx. 7 lb (3 kg) ... ... Each **£2·15** *cx*

CLEANING BRUSHES see BU-430 et seq.
ULTRASONIC CLEANING see UL-150 et seq.
WASHING and DRYING EQUIPMENT see WD-020 et seq.

CLIPS

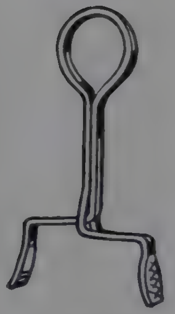
CP-220

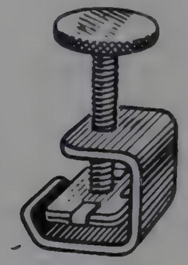
CLIPS, Mohr, nickel plated brass, for burettes, tubing, etc. In packs of six.

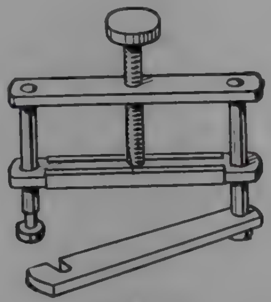
No.	1	2	3	4	
Length	5	6	7	8 cm	
10 packs	£7·60	8·00	10·00	16·00	cx
Pack	£0·84	0·90	1·12	1·80	

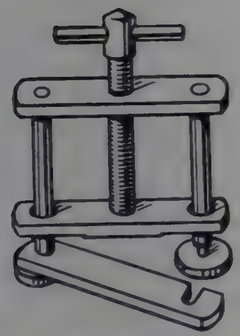
CP-230

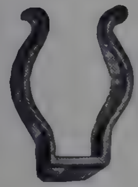
CLIP, open sided, nickel plated brass screw clip with broad pressure pad for use on tubing up to 12 mm dia. In pack of six ... 10 packs **£11·80** Pack **£1·30** cx

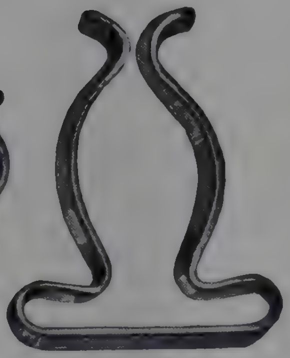

CP-220

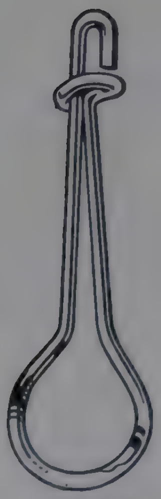

CP-230

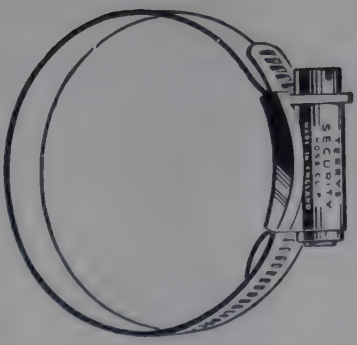

CP-240

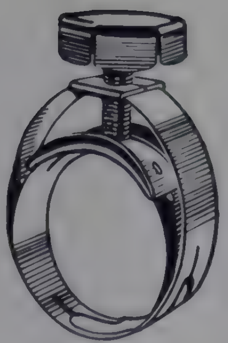

CP-245


CP-264


CP-266


CP-275


CP-282


CP-285

CLOCKS, stopclocks	see	TIMING APPARATUS
CLOCKS, wall	see	FURNITURE
CLOTH, asbestos	see	ASBESTOS GOODS

CP-240

CLIPS, Hoffman, nickel plated brass, with clamping screw and hinged bottom plate. In packs of six.

No.	1	2	3	4	5	
Distance between bars	15	20	25	32	40 mm	
10 packs	£14·00	12·00	12·60	13·40	18·00	cx
Pack	£ 1·55	1·35	1·40	1·50	2·00	

CP-245

CLIP, Hoffman, extra strong. Distance between bars 32 mm ... ... Ten **£10·00** Each **£1·10** cx

CP-264

CLIPS, open spring, with polythene coating which provides a tough resilient surface, prevents scratching and resists corrosion. In packs of 10 complete with screws.

CP-266

CLIPS, as CP-264, but **closed spring.** In packs of 10 complete with screws.

Grip diameter nominal		CP-264		CP-266		
mm	in	10 packs	Pack	10 packs	Pack	
		£	£	£	£	
6	¼	2·90	0·35	2·90	0·35	mx
10	⅜	2·90	0·35	2·90	0·35	mx
13	½	3·50	0·41	3·50	0·41	mx
16	⅝	3·50	0·41	4·10	0·46	mx
19	¾	4·10	0·46	4·70	0·52	mx
25	1	4·10	0·46	4·70	0·52	mx
32	1¼	4·90	0·54	5·60	0·62	mx
38	1½	5·10	0·57	7·10	0·80	mx
51	2	7·50	0·84	9·60	1·06	mx

CP-275

CLIP, tubing, corrosion resisting steel, for securely fastening rubber and plastics tubing to glass and metal tubulures and taps. The clip is very easy to fit and does not need a tool. It is much quicker to make a temporary connection using this clip than by twisting wire round the joint and it is more easily removed. The clip is a suitable size for condenser water connections and similar applications where the outside diameter of the tubing when stretched over a tubulure is about 10 mm. In pack of 25 ... ... Ten packs **£7·40** Pack **£0·82** cx

CP-282

CLIPS, worm drive to BS 3628, zinc plated steel, with band and deep square milled thread, for securing rubber tubing to water taps, etc.

Maximum dia.	19	25	35	48 mm	
Closing down to	13	19	25	32 mm	
Ten	£0·75	0·75	0·80	0·85	cx
Each	£0·15	0·15	0·15	0·16	

CP-285

CLIPS, hose, with double stainless steel band totally encircling the tube.

Maximum dia.	14	17	22	25	30 mm	
Closing down to	10	13	18	21	26 mm	
Ten	£2·35	2·35	2·35	2·35	2·35	cx
Each	£0·30	0·30	0·30	0·30	0·30	

PROTECTIVE CLOTHING

APRONS

CP-705

APRON, polythene, expendable, bib-fronted. Intended to be thrown away when contaminated. Size 90 × 65 cm.
In pack of 25 ... ... Pack **£2·20** *cx*

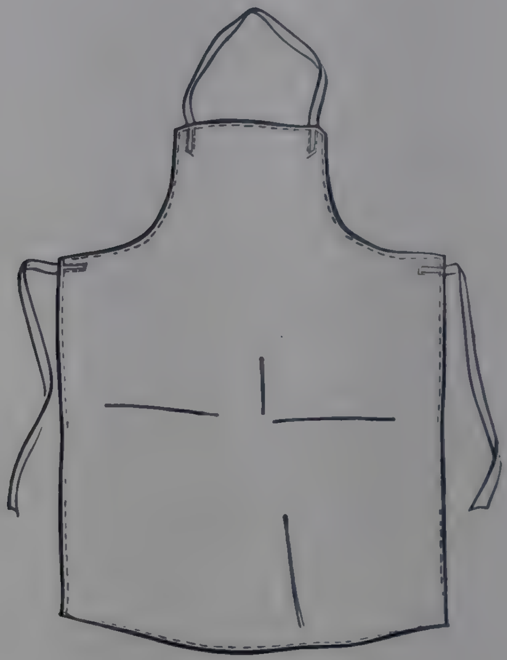
CP-715

APRON, PVC, white bib-fronted, for protection against many chemicals. Size 100 × 90 cm.
Ten **£11·00** Each **£1·25** *cx*

CP-720

APRON, fabric supported acrylonitrile, bib-fronted for protection against many dilute acids, oils and organic solvents. Size 100 × 90 cm.
Ten **£27·00** Each **£3·00** *cx*

For general properties of plastics materials and elastomers refer to table on page headed Plastics.



CP-715

LABORATORY COATS

LABORATORY COATS in white drill, in men's and women's styles, are well made of good quality materials. All seams are lapped and lock-stitched, two side and breast pockets are reinforced and double stitched. Removable buttons with ring fasteners have ample facings to prevent damage to clothing.

CP-740

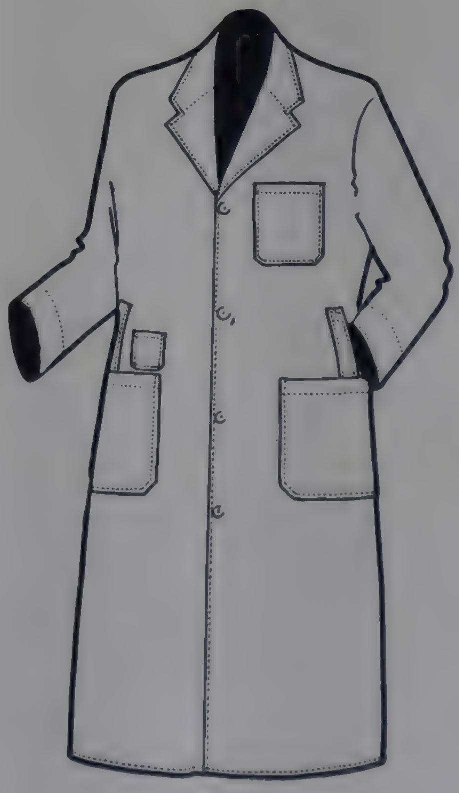
COATS, LABORATORY, white drill, for men, length approx. 46 in (118 cm).

Chest size	38	40	42	44 in	
	96	102	107	112 cm	
Each	**£3·00**	**3·00**	**3·00**	**3·00**	*mx*

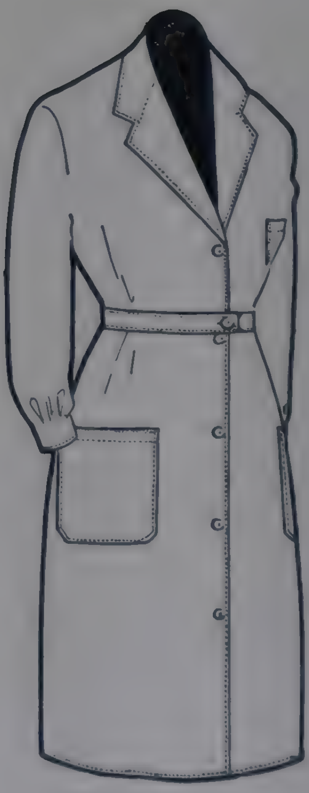
CP-750

COATS, LABORATORY, white drill, for women, belted and with step collar, length approx. 45 in (115 cm).

Bust size	34	36	38	40 in	
	86	91	96	102 cm	
Each	**£2·60**	**2·75**	**2·75**	**2·75**	*mx*



CP-740



CP-750

OTHER PROTECTIVE EQUIPMENT

FF-300 to FF-400	Fire extinguishers.
FY-955	Cupboard for storage of poisons and dangerous materials.
FY-957	Transparent safety screen.
GP-300	Safety grip which protects the hands when manipulating glass tubing.
MA-950	Manipulator glove box for handling toxic powders, etc.

PROTECTIVE CLOTHING

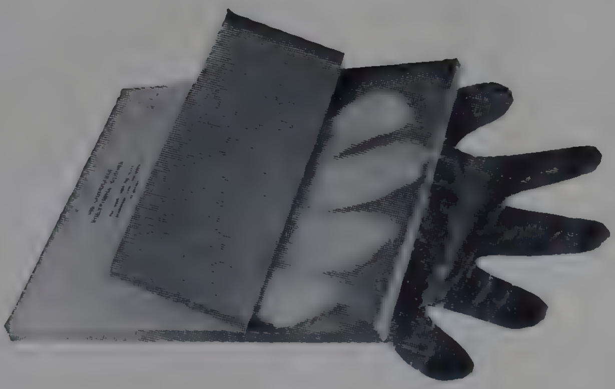
HOW TO MEASURE FOR GLOVES

Hold the right hand flat with fingers touching each other and with thumb raised. Measure around widest part of the hand, over knuckles, not including the thumb. Pull tape measure close, but not tight. Number of inches is glove size. For industrial gloves where loose fit is preferred to give 'working room', order 1 or 2 sizes larger than measurement.

CP-770

CP-775

CP-780


CP-792

CP-812

CP-816

CP-820

GLOVES

CP-770

GLOVES, asbestos, cotton lined, with thumb only. Pair **£1·65** *mx*

CP-775

GLOVES, asbestos, cotton lined, with fingers and thumb ... ... Pair **£2·50** *cx*

CP-780

GLOVES, chrome leather, wrist length. Pair **£0·60** *cx*

***CP-792**

GLOVES, polythene, expendable. These gloves, made from 150 gauge (0·04 mm) transparent polythene, provide an inexpensive hand cover which can be worn once and thrown away if contaminated. Supplied in handy dispensing packs of 100 gloves.

Size	Small	Normal	
Pack	**£0·95**	**0·95**	*cx*

CP-794

GLOVES, latex rubber, surgical type for general protection with extreme finger sensitivity.

Size	7	8	9	
10 pairs	**£2·20**	**2·20**	**2·20**	*cx*
Pair	**£0·29**	**0·29**	**0·29**	

CP-806

GLOVES, acrylonitrile, light duty, flock lined, with good finger sensitivity. Length 27 cm.

Size	7	8	9	
Pair	**£0·35**	**0·35**	**0·35**	*cx*

CP-812

GLOVES, PVC, light duty, with cotton interlock lining. These gloves are flexible and resistant to most dilute acids, oils and greases. Length 27 cm.

Size	8	9	10	
Pair	**£0·60**	**0·60**	**0·60**	*cx*

CP-816

GLOVES, PVC, medium duty. Tough, flexible gloves with cotton interlock lining. Highly resistant to most acids, oils and greases. Length 27 cm.

Size	7½	8½	9½	
Pair	**£0·70**	**0·70**	**0·70**	*cx*

CP-820

GLOVES, PVC, as CP-816 but gauntlet pattern. Length 40 cm.

Size	7½	8½	9½	
Pair	**£1·00**	**1·00**	**1·00**	*cx*

For general properties of elastomer materials see table on page headed Plastics.

MANIPULATOR BOX GLOVES see MA-955 et seq. in List No. sequence.

PROTECTIVE CLOTHING

EYE PROTECTION

CP-835

GOGGLES, lightweight, with well ventilated moulded nylon cups, adjustable nosebridge and elastic headband. Fitted with 5 cm dia. clear laminated safety glasses.
Each **£1·35** *cx*

CP-838

GOGGLES, lightweight, as CP-835 but fitted with laminated safety glasses tinted green to Shade 5 of BS 679 instead of plain glasses ... ... Each **£1·55** *cx*

CP-865

EYESHIELD, plastics, a light duty eyeshield with shatter resistant clear acetate window.
Ten **£7·60** Each **£0·84** *cx*

CP-870

GOGGLES, full view, flexible plastics with perforated vents and an adjustable elastic headband. **Can be used over corrective spectacles.**
10 pairs **£11·20** Pair **£1·25** *cx*

CP-880

FACE SHIELD, with clear plastics visor, 20 cm deep, fitted to fibre head support by a swivel attachment which allows the visor to be easily raised clear of the face. The soft padded head support is attached to an adjustable elastic headband ... ... Ten **£15·00** Each **£1·70** *cx*

CP-890

LIGHTWEIGHT SAFETY SPECTACLES, with nylon frames and removable ventilated side shields. Fitted with clear, safety toughened glass lenses. Supplied in plastics case. ... 10 pairs **£19·00** Pair **£2·15** *cx*

ACCESSORIES

CP-892 **Lenses, heatsaver,** for protection against excessive infrared and ultraviolet ... ... Pair **£1·40** *cx*

CP-894 **Lenses, anti-glare,** *Chance* ON 12 didymium oxide glass for general glassblowing work ... ... Pair **£8·30** *cx*

RESPIRATORS

CP-898

FACE MASK, disposable, strong absorbent paper with stitched elastic ear loops. Supplied folded and when in use can be opened out to fit comfortably over the mouth and nose. In pack of 100 ... ... Pack **£1·35** *mx*

CP-920

RESPIRATOR, moulded rubber body with 65 mm dia. anodised aluminium screw retainer and one filter CP-924, or as specified by the customer when ordering. Fitted with two relief valves and an adjustable elastic headband ... ... Ten **£18·00** Each **£2·00** *cx*

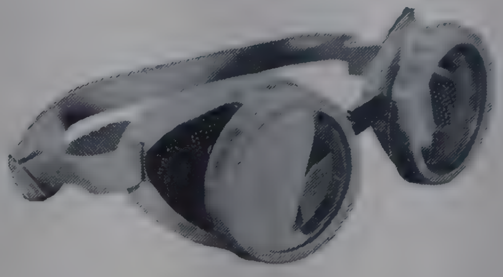
ACCESSORIES

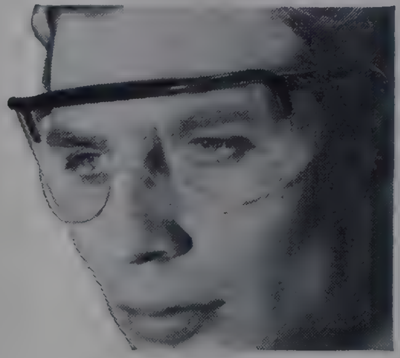
CP-922 **Filters,** set of three (one each CP-924, CP-926 and CP-928) in box. 10 sets **£11·60** Set **£1·30** *cx*

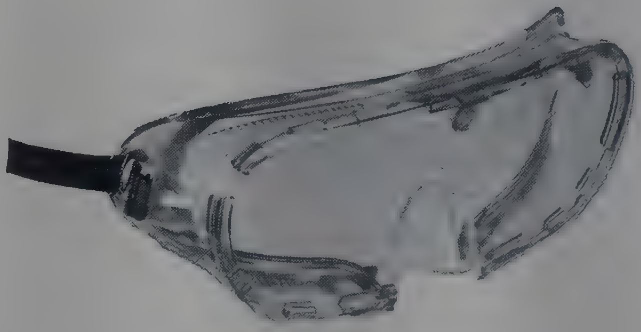
CP-924 **Filter, yellow spot,** for protection against low concentrations of toxic dusts.
Ten **£4·00** Each **£0·45** *cx*

CP-926 **Filter, red spot,** for protection against paint vapour and particles ... ... Ten **£4·00** Each **£0·45** *cx*

CP-928 **Filter, green spot,** for protection against low concentrations of organic vapours and acid gases.
Ten **£4·00** Each **£0·45** *cx*


CP-835


CP-865


CP-870

CP-880

CP-890

CP-898

CP-920

Gallenkamp COLORIMETER

With solid state stabiliser circuit.

A robust reliable colorimeter with a wide range of chemical and biochemical applications in the wavelength band 450 to 670 nm.

Applications include:

Clinical and biochemical analysis of blood, urine and other body fluids.

Food analysis and quality control.

Inorganic and organic chemical analysis.

Iron, steel and non-ferrous metals analysis.

optical density
Gallenkamp COLORIMETER

CS-200

- **Stable operation with negligible drift**
- **Rapid response**
- **Simple to operate and maintain**
- **Mirror-scale meter—reads optical density direct**
- **3-position self-indexing cell holder**
- **Lamp and photocell easily replaced**
- **Optional flowthrough cell**
- **Available for 12V battery operation**

DESIGN

Lamp. The lamp is under-run for long life and over 60% of its light output is utilised. To reduce heating effects to a minimum, a heat filter is interposed between the lamp and the sample. The lamp is readily accessible for replacement purposes; **processed lamps CS-208 must be used.**

Filters. The *Ilford* colour filters used provide the instrument with adequate reserve sensitivity for blank solutions of up to 0·4 optical density.

Cell holder. A 3-position polypropylene self-indexing sample holder accepts 10 mm rectangular cuvettes, test tubes and the flowthrough cell. A drain beneath the holder prevents accumulation of spillage.

Photocell and zero control. The epoxy resin encapsulated photocell is readily accessible for replacement purposes. The zero control has a very smooth action and since it is mechanical and not a variable resistor, the meter response remains brisk at all settings of the control.

Meter. The 11·5 cm scale length meter is fitted with anti-parallax mirror and an antistatic window to avoid pointer errors due to static electricity.

PERFORMANCE

Wavelength range. 450 to 670 nm.

Accuracy. The instrument gives results of an order of accuracy of 1% by direct reading. For higher accuracy it is recommended that a calibration curve be drawn.

Stability. Total drift over long periods is well within 0·005 o.d. units. A 10% variation in mains voltage produces a change in reading of less than 0·005 o.d. units; a ±5 Hz variation in mains frequency produces a change in reading of less than 0·006 o.d. units.

Sample heating. Over a two hour period the sample heats up by only about 5degC.

Flowthrough cell. For multiple, routine testing of similar samples, the flowthrough cell is recommended. With this, up to four tests per minute may comfortably be performed. The cell is supplied complete with squeeze bottle and connecting tube for emptying.

DIMENSIONS AND WEIGHT

	H W D
Overall	17×21×35 cm
Weight, net	7·3 kg

Gallenkamp COLORIMETER

REGD TRADE MARK

CS-200

COLORIMETER, PHOTOELECTRIC, *Gallenkamp,* 450 to 670 nm, as specification, with solid state stabiliser circuit, direct reading mirror-scale meter, polypropylene 3-position, self-indexing cell holder, mechanical shutter, processed lamp and encapsulated photocell. Supplied with dust cover but **without colour filters or test cells.** For 100/130 and 200/250V 50/60 Hz single phase supplies ... ... Each **£107·20** *bx*

When ordering please state voltage and frequency of supply.

CS-205

COLORIMETER OUTFIT, *Gallenkamp,* comprising one CS-200 colorimeter, one each colour filters CS-212, CS-215 and CS-218, and three test cells CS-250. Each **£123·55** *bx*

CS-206

COLORIMETER, PHOTOELECTRIC, *Gallenkamp,* as CS-200 but for 12V d.c. battery supplies. **Without colour filters, test cells or battery.** Each **£107·20** *bx*

REPLACEMENT PARTS

CS-208 **Lamp,** 6V, 1A, prefocus, specially processed. Each **£1·90** *bx*

CS-209 **Photocell** ... ... Each **£3·25** *bx*

When ordering replacement parts please state serial number of colorimeter and supply voltage.

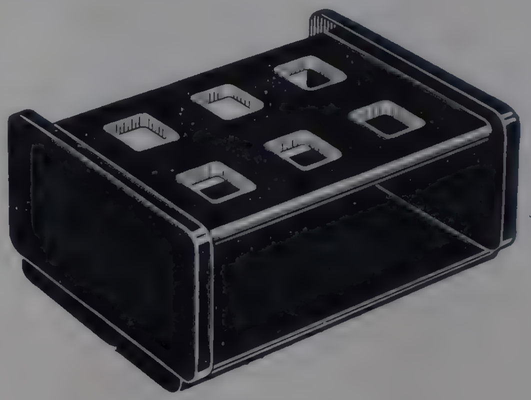
ACCESSORY FILTERS

Colour filters, in plastics mounts.

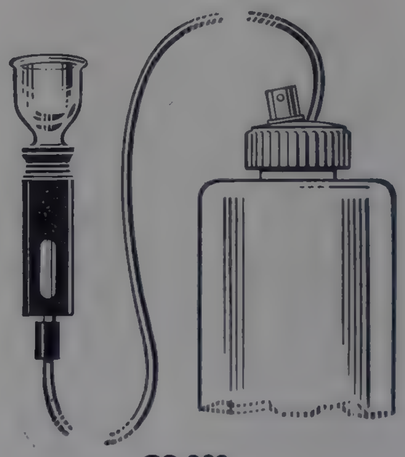
List No.	Colour	*Ilford* No.	Peak trans-mission nm	Each	
				£	
CS-211	Violet	621	450	3·95	*mx*
CS-212	Blue	622	470	3·95	*mx*
CS-213	Blue-Green	623	490	3·95	*mx*
CS-214	Green	624	520	3·95	*mx*
CS-215	Yellow-Green	625	540	3·95	*mx*
CS-216	Yellow	626	570	3·95	*mx*
CS-217	Orange	607	600	3·95	*mx*
CS-218	Red	608	670	3·95	*mx*

CS-230 **Filter,** *Chance* **HAI,** heat absorbing glass, in plastics mount. Recommended for use with filters which are heat sensitive and especially with filter CS-218 to reduce the infrared light incident on the photocell. Each **£2·35** *mx*

CS-240 **Filter,** *Keeler,* neutral density. Optical density of approximately 0·48 with filter CS-215. Approximately equivalent to 10 mm of a 1 in 201 dilution of blood of 14·6 g Hb% W/V... ... ... Each **£8·90** *mx*



CS-255



CS-282

ACCESSORY TEST CELLS

CS-250 **Test cell,** fused glass, 10 mm optical depth, capacity 6 ml. Each **£1·50** *bx*

CS-252 **Test cells, matched set** of three cells CS-250. Set **£4·20** *bx*

CS-255 **Rack,** bakelite, to hold 6 test cells CS-250. Each **£3·40** *bx*

CS-260 **Adapter, test tube,** to hold tubes CS-270 in colorimeter CS-200 ... ... Each **£0·75** *bx*

CS-265 **Adapters, test tube,** as CS-260 but matched set of three, numbered and marked ... ... Set **£3·70** *bx*

CS-270 **Test tube,** 10 mm internal diameter, 75 mm long, selected for uniform internal diameter ... Pack of 10 **£0·60** *bx*

CS-275 **Test tubes,** set of twelve tubes, CS-270 marked at uniform transmission position ... ... Set **£4·00** *bx*

CS-280 **Rack,** plastics, to hold nine test tubes CS-270 and three adapters CS-260 ... ... Each **£3·75** *bx*

CS-282 **Flowthrough cell,** as specification, comprising cylindrical glass cell in holder, plastics connecting tubing and squeeze bottle for emptying ... ... Each **£3·80** *bx*

CS-283 **Flowthrough cell,** in holder only ... Each **£2·30** *bx*

LOVIBOND COLORIMETRIC ANALYSERS

The Lovibond system of colorimetric analysis has earned a world-wide reputation by providing simple test methods which employ easy-to-use, rugged apparatus.

The principle is simple; samples are prepared by clearly described proven methods and are compared visually with accurately coloured glass standards. Standards are available for many tests in the fields of chemistry, chemical pathology, quality grading and public health control among which are the following examples.

CHEMISTRY

Aluminium
Ammonia
Bromine and bromide
Chlorine and chloride
Chromium
Cobalt
Copper
Fluoride
Iron
Lead
Magnesium
Manganese
Nickel
Nitrate
Nitrite
Oxygen
Phosphate
Silica
Silver
Sodium
Sulphate
Sulphite
Tin
Titanium
Amines
Carbohydrates
Chlorinated hydrocarbons
Pesticides
Detergents
Nicotine
Organic acids
Phenols
Pyridine
Sugar
Thiocyanate
Thiophen
and many airborne toxic gases and vapours

CHEMICAL PATHOLOGY AND PUBLIC HEALTH

p-Amino salicylic acid
Bilirubin
Carboxyhaemoglobin
Cholesterol
Cholinesterase
Haemoglobin
Lead
Mepacrine
Morphine
Nicotinic acid
Phosphate
Protein
Sugar
Sulphonamide
Urea

QUALITY GRADING

Petroleum product colours
Beer colours
Solvent colours
BOD
Butter colours
Vegetable oil colours
FAC scale
Gardner scale
Hazen scale
Relative humidity
Milk product colours
Milk testing
Rubber latex
Sand quality
Sand colour
Varnish colours
Swimming pool and water testing

These are three basic forms of analysers:—

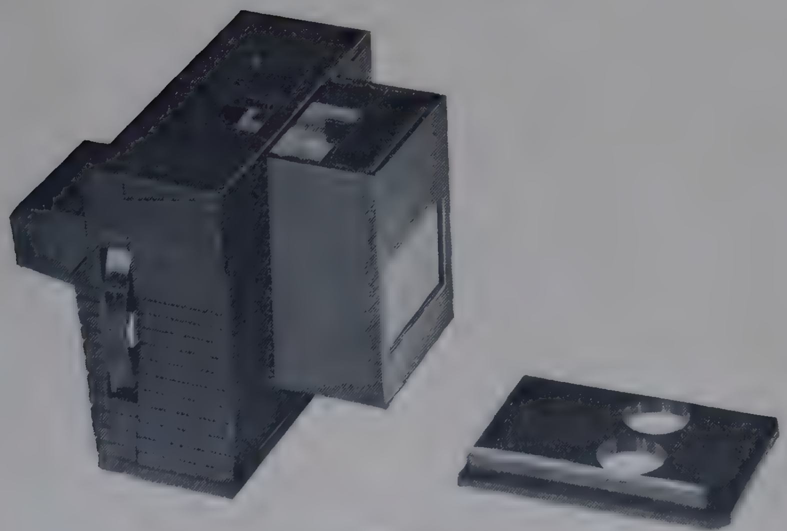
COMPARATOR. Comprises a hinged black plastics case which accommodates a disk containing a number of permanent colour standards and two cells, one for the sample and one for the blank. Each test requires the use of a disk containing standards representing the range of colours produced by different concentrations of the material under test.

NESSLERISER. For analysis by the Nessler method, cylinders are viewed side by side from the top against an inclined white reflector. Matching is achieved by means of a colour filter disk which is complementary to one cylinder.

TINTOMETER. A double beam instrument with built-in light sources and a range of colour filters and controls which enable any colour to be accurately described or matched. The two emergent beams are brought side-by-side to one eyepiece for precise comparison.

LOVIBOND '1000' COMPARATOR

CT-700 with CT-710 and two CT-716



CT-700 with CT-710 and CT-714

When fitted with accessories the comparator provides a versatile system for visual colorimetric analysis capable of:—

- **Measurements with cells up to 40 mm lightpath**
- **Measurements on dilute solutions using special Nessler cylinders up to 250 mm sample depth**

CT-700

COMPARATOR, Lovibond '1000', a robust, portable plastics case which accepts two tubes or cells up to 13·5 mm lightpath and one disk containing permanent colour standards. The disk is revolved by hand and a click-stop locates each colour standard in the viewing aperture. **Without tubes, cells or disk** ... Each **£7·50** *fx*

CT-710

PRISM ATTACHMENT, which brings the sample and colour standard fields of view together for easier and more accurate comparison. Clips on the front of comparator CT-700 ... ... Each **£6·50** *fx*

CT-714

LARGE CELL ATTACHMENT. Slots into the back of comparator CT-700 and allows comparisons to be made on cells from 15 to 40 mm optical depth. Each **£1·00** *fx*

ACCESSORIES

CT-716 **Cells, glass, precision square.**

Light path	13·5	25	40 mm	
Pair	£0·90	4·00	6·00	fx

LOVIBOND '1000' COMPARATOR

ACCESSORIES

CT-740

NESSLER ATTACHMENT, for examining dilute solutions of pale colour. The hinged metal case accepts two Lovibond Nessler cylinders up to 250 mm sample depth, and the comparator CT-700 slots on to the top. Overall dimensions without comparator 10×11×37 cm high. **Requires but does not include comparator CT-700, Nessler cylinders and Nessleriser disk.**
Each **£10·00** *fx*

CT-742	**Nessler cylinders,** 250 mm sample depth.	Pair **£3·00** *fx*
CT-844	**Nessler cylinders,** 113 mm sample depth. For details and price see entry in List No. sequence.	

For suitable Nessler disks see CT-850 to CT-859 in List No. sequence.

CT-740 with CT-700 and CT-710

CT-780

WHITE LIGHT CABINET, bench mounting, providing a source of simulated Illuminant C artificial daylight. Ensures complete standardisation of viewing conditions essential for high precision colour comparisons. Accepts comparator CT-700 and Nessler attachment CT-740. With daylight correction blue glass filter and On/Off switch. Overall dimensions 29×18×14 cm high. With legs to allow cabinet to be positioned at any convenient viewing angle. For 220/240V a.c. single phase supplies.
Each **£16·50** *fx*

CT-780 with CT-782, CT-700 and CT-710

CT-790

COLORIMETRIC CHEMICAL ANALYTICAL METHODS, a set of three volumes containing over 300 tests methods covering organic and inorganic chemical analysis, biochemistry, pharmacology, toxic substances in air, colour grading and quality testing ... Set **£6·00** *fzN*

DISKS FOR COMPARATOR CT-700

List No.	Code	Test	Range	Subdivision	Method	Each	
CT-810	2/1 A	pH	1·2–2·8	0·2 pH	Thymol blue	£ **7·00**	*fx*
CT-812	2/1 B	pH	2·8–4·4	,,	Bromophenol blue	**7·00**	*fx*
CT-814	2/1 E	pH	4·4–6·0	,,	Methyl red	**7·00**	*fx*
CT-816	2/1 H	pH	6·0–7·6	,,	Bromothymol blue	**7·00**	*fx*
CT-818	2/1 J	pH	6·8–8·4	,,	Phenol red	**7·00**	*fx*
CT-821	2/1 L	pH	8·0–9·6	,,	Thymol blue	**7·00**	*fx*
CT-824	3/2 AB	Chlorine in water	0·15–2·0 ppm	—	Acid o-tolidine	**7·00**	*fx*
CT-826	3/12	Phosphate in boiler water	0–80 pm	—	Hydroquinone	**7·00**	*fx*

BDH LOVIBOND NESSLERISER

CT-835

CT-835

NESSLERISER, *BDH* **Lovibond,** for colorimetric tests. This instrument permits the analysis of dilute solutions by the use of greater depths of liquids. The moulded body holds the disk, containing nine permanent colour standards, which revolves in a compartment above two Nessler cylinders, one containing the test solution and the other a compensating 'blank'. A prism unit is incorporated so that the two fields of view are brought together for easier viewing and higher discrimination. The base houses a light source with daylight correction filter and ON/OFF switch. This enables the instrument to be used by daylight and at night without the use of a separate lighting cabinet. Complete with two Nessler cylinders but **without disk.** For 220/240V a.c. single phase supplies ... ... Each **£26·00** *fx*

REPLACEMENT PARTS AND ACCESSORIES

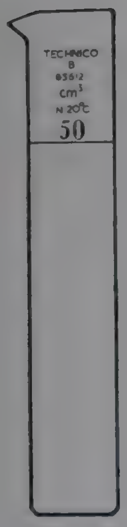
CT-844	**Nessler cylinders,** 113 mm sample depth	Pair	**£1·50**	*fx*
CT-846	**Nessler cylinder** modified for oxygen in boiler water by indigo carmine method.	Each	**£3·30**	*fx*
CT-742	**Nessler cylinder,** 250 mm sample depth. For price see entry in List No. sequence.			

DISKS

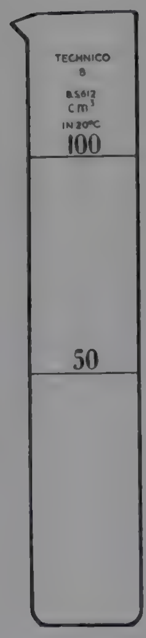
List No.	Code	Test	Range	Method	Each	
					£	
CT-850	NLF	pH	8·0–9·6	Thymol blue	**7·00**	*fx*
CT-852	NAA	Ammonia	1–10 μg	Nessler's reagent	**7·00**	*fx*
CT-854	NAB	,,	10–26 μg	,,	**7·00**	*fx*
CT-856	NAC	,,	28–60 μg	,,	**7·00**	*fx*
CT-858	NOE	Oxygen in boiler water	0–0·12 ml/l	Indigo-carmine	**7·00**	*fx*
CT-859	NOH	Hydrazine in boiler water	0–10 μg	—	**7·00**	*fx*

For details of comparator CT-700 and Nessler attachment CT-740 see entries in List No. sequence.

NESSLER CYLINDERS



CT-862



CT-863

CT-862

CYLINDERS, Nessler, *Technico,* to BS 612, with mark at 50 cm³. Lead free glass, with polished bottoms. Supplied in pack of six with marks all one height ±1 mm. Pack **£3·65** *ax*

CT-863

CYLINDERS, Nessler, *Technico,* as CT-862 but with marks at 50 and 100 cm³. Supplied in pack of six with height of corresponding marks ±1 mm. Pack **£4·45** *ax*

CT-865

CYLINDERS, Nessler, *Emil,* to BS 612, made from tubing with shadowless base. One mark at 50 cm³, in pairs matched ±1 mm. 6 pairs **£2·88** Pair **£0·54** *jx*

CT-866

CYLINDERS, Nessler, *Emil,* as CT-865 but with 2 marks at 50 and 100 cm³, in pairs matched ±1 mm ... ... 6 pairs **£3·72** Pair **£0·68** *jx*

CT-868

CT-868

STAND, for six 50 cm³ **Nessler** cylinders, black painted hardwood, with opal glass base ... ... Each **£1·65** *cx*

CT-869

STAND, as CT-868 but to take six 100 cm³ **Nessler** cylinders ... Each **£1·70** *cx*

LOVIBOND TINTOMETERS

Lovibond Tintometers provide a reliable and straightforward means of specifying the colours of liquid samples in standard cells or of solid samples. All models have colour filters built-in to enable a colour to be assembled until it matches the colour of the sample. Matching is done visually because no satisfactory physical substitute has been found for so accurately judging the subjective property of colour. Stating the filters required to match the sample specifies the sample colour.

Three standard Tintometers are offered, two with provision for internal sample examination and one with flexible optics and test head for external sample evaluation. The latter is useful where the samples under test cannot be placed within the instrument.

CT-870

CT-870

TINTOMETER, Standard Model AF 700, for general laboratory and works use on liquids or solids of light to medium colour. Complete with 10 mm and 1 in cells, 60 colour filters and 12 neutral tints, white light cabinet and box containing cleaning, setting-up and maintenance accessories and tools. For 200/240V a.c. supplies.
Each **£210·00** *fxN*

CT-872

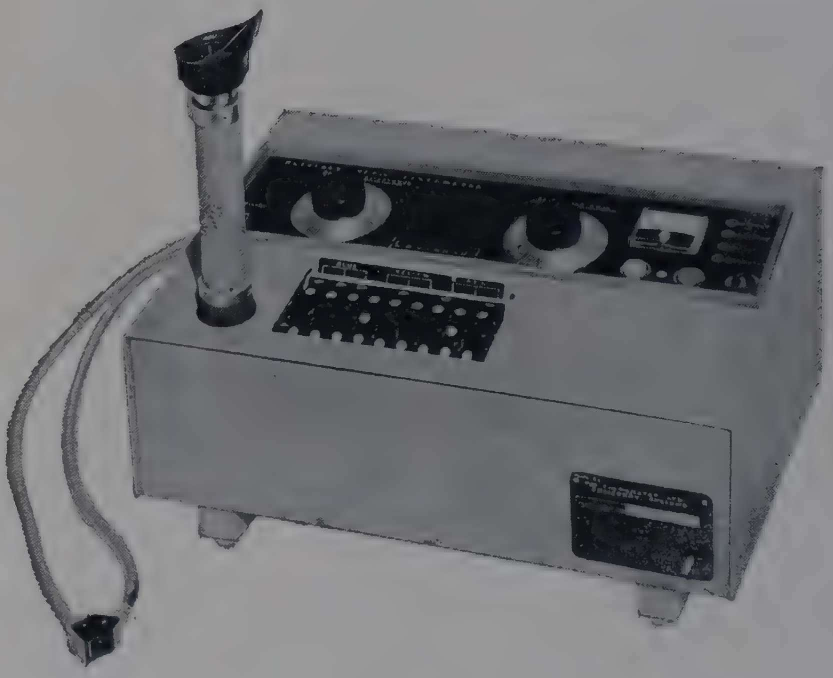
TINTOMETER, Universal Model AF 702, as CT-870 but with 12 extra colour filters to extend range to deeper colours, e.g. paints, inks, cosmetics, etc. Each **£256·00** *fxN*

REPLACEMENT PART

CT-874 **White light cabinet,** complete with two lamps, two magnetic chucks, two magnesium carbonate blocks, porcelain tray, presser and frame for powders, book of analysis forms and separate accessories box.
Each **£44·50** *fxN*

CT-882

TINTOMETER, Flexible optics Model AF 751, for work on very large or small samples or samples which must be examined under controlled environmental conditions. With 405 mm optical leads, standard surface viewing head, liquid viewing (cell holder) head, 73 colour filters, 10 and 40 mm cells, spare lamp and box containing cleaning, setting-up and maintenance accessories and tools. For 200/240V a.c. supplies ... Each **£375·00** *fxN*



CT-882

CELLS FOR TINTOMETERS CT-870 TO CT-882

CT-886

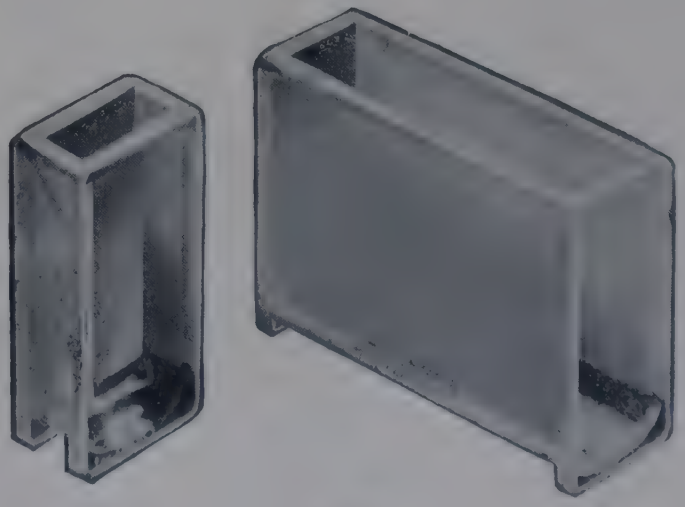
CELLS, fused glass, for liquid samples.

Light path	6	5¼	1 in	
Each	**£4·00**	**4·00**	**2·00**	*fx*

CT-888

CELLS, fused glass, for liquid samples.

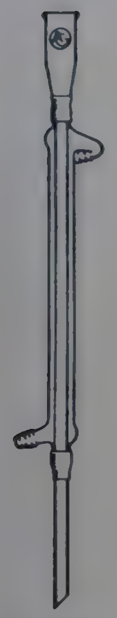
Light path	40	25	10	5 mm	
Each	**£3·00**	**2·00**	**2·00**	**2·20**	*fx*

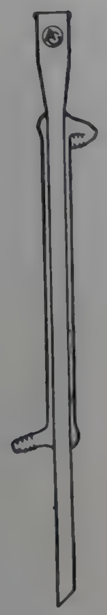


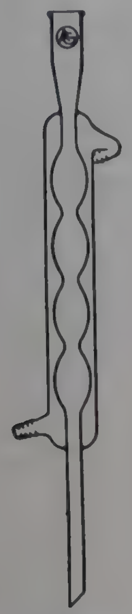
CT-886
CT-888

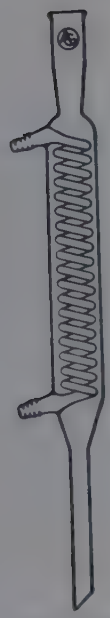
AG
Regd

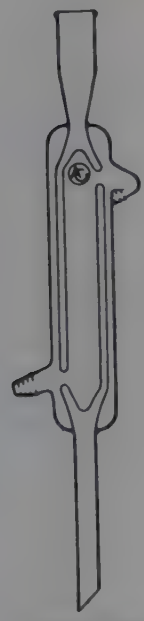
CONDENSERS

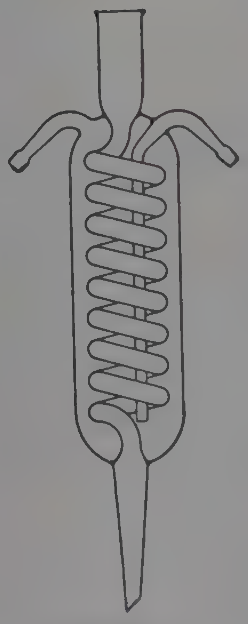

CU-320


CU-330


CU-340


CU-350


CU-360


CU-380

DISTILLATION COLUMNS	see	DISTILLATION
DISTILLATION FLASKS	see	FLASKS
DISTILLATION RECEIVERS	see	CYLINDERS
STILLHEADS	see	DISTILLATION

CONDUCTIVITY BRIDGES
see ELECTROCHEMICAL ANALYSIS

CONE JOINTS see JOINTS

CONNECTORS, electrical
see ELECTRICAL APPARATUS

CONNECTORS, tubing
see TUBING CONNECTORS

CU-320

CONDENSERS, AG **Liebig, borosilicate glass,** efficient narrow jacket with rubber connections, to BS 1848.

Length of jacket	25	50 cm	
Dia. of jacket	20	20 mm	
Ten	**£8·00**	**9·00**	*ax*
Each	**£0·90**	**1·00**	

MW-098
CONDENSER, Liebig reflux.

NR-210
CONDENSER, Kjeldahl.

WJ-130
CONDENSER, Dean & Stark, to BS 756.

For prices see entries in List No. sequence.

CU-330

CONDENSERS, AG **Liebig, borosilicate glass,** with narrow fused-on jacket, to BS 1843.

Length of jacket	25	50 cm	
Dia. of jacket	20	20 mm	
Ten	**£10·00**	**12·20**	*ax*
Each	**£ 1·12**	**1·35**	

CU-340

CONDENSERS, AG **Allihn, borosilicate glass,** fused-on jacket, to BS 1848.

Length of jacket	25	50 cm	
Dia. of jacket	37	37 mm	
Ten	**£26·50**	**32·00**	*ax*
Each	**£ 2·95**	**3·60**	

CU-350

CONDENSERS, AG **Graham, borosilicate glass,** with fused-in cooling spiral, to BS 1848.

Length of jacket	25	50 cm	
Dia. of jacket	37	37 mm	
Ten	**£26·50**	**32·00**	*ax*
Each	**£ 2·95**	**3·60**	

CU-360

CONDENSERS, AG **Davies double-surface pattern, borosilicate glass** to BS 1848.

Length of jacket	15	20	30 cm	
Approx. condensing surface	200	300	450 cm²	
Dia. of jacket	43	43	43 mm	
Ten	**£28·50**	**29·00**	**35·00**	*ax*
Each	**£ 3·20**	**3·20**	**3·90**	

CU-380

CONDENSER, AG **Thorpe,** Inland Revenue pattern, **borosilicate glass,** to BS 1848. Length of jacket 20 cm, dia. 67 mm ... ... Ten **£53·00** Each **£5·90** *ax*

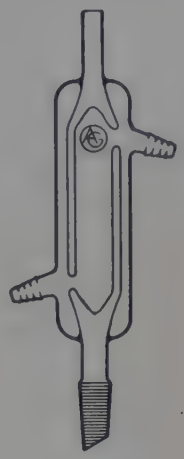
CONDENSERS, standard distillation—see PE-790 to PE-795 in List No. sequence.

CONDENSERS

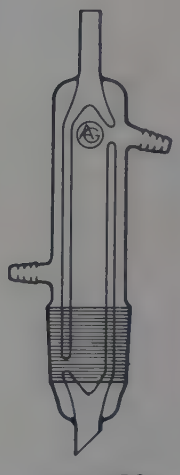
Regd.

DAVIES DOUBLE-SURFACE CONDENSERS

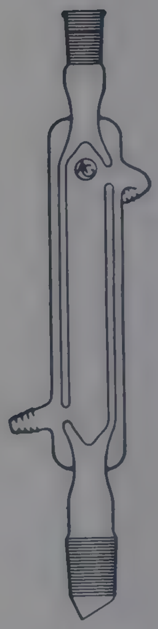
All *Gallenkamp* manufactured Davies condensers have a gradual taper at the lower end of the inner tube so that the condenser can be used in an inclined position without any liquid trap occurring at the shoulder.



CU-520



CU-530



CU-550

CU-520

CONDENSERS, AG Davies double surface, borosilicate glass, for reflux use, with cone joint.

Length of jacket	15	20 cm	
Cone	29/32	29/32	
Ten	**£29·50**	**32·00**	*ax*
Each	**£ 3·30**	**3·60**	

CU-530

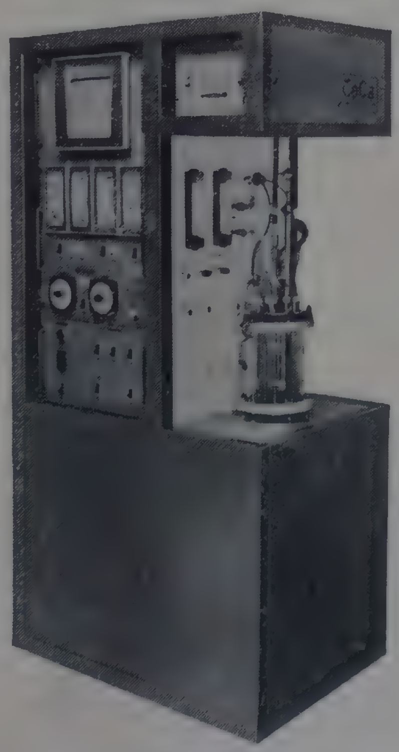
CONDENSERS, AG Davies double surface, borosilicate glass, for reflux use, with cone joint. These condensers on the larger size of standard joint are a very compact design in which the cone joint forms the lower portion of the outer jacket. Length of jacket 20 cm.

Cone	40/38	50/42	
Ten	**£29·50**	**32·00**	*ax*
Each	**£ 3·30**	**3·60**	

CU-550

CONDENSERS, AG Davies double surface, borosilicate glass, with cone and socket joint. Socket 19/26. Length of jacket 20 cm.

Cone	19/26	24/29	
Ten	**£31·00**	**33·00**	*ax*
Each	**£ 3·40**	**3·70**	



For continuous culture of micro-organisms

Gallenkamp CeCa
REGD. TRADE MARK

CONTROLLED ENVIRONMENT CULTURE APPARATUS

By providing close control over chemical and physical conditions, CeCa creates a stable environment for long term continuous growth of bacteria, fungi, algae, protozoa, viruses and cultured plant and animal cells.

- **Vaccines**
- **Antibiotics**
- **Enzymes**
- **Dairy fermentations**
- **Brewing**
- **Sewage**
- **Effluents**

See CX-650 in List No. sequence.

***CV-010**

CORKS, best quality, tapered, cut with the grain. For general chemical use. Dimensions are approximate. Supplied in cartons of uniform size for convenient storage. Carton contents listed against each size are approximate.

10 cartons **£8·60** Carton **£0·96** *cx*

Small end	6	8	9	11	12	14 mm
Large end	9	11	12	14	15	17 mm
Length	16	18	23	23	27	27 mm
Contents, approx.	440	380	320	280	225	190

Small end	15	17	18	20	21 mm
Large end	18	20	21	23	24 mm
Length	27	27	32	32	32 mm
Contents, approx.	150	110	80	70	65

Small end	23	24	26	28	30	32 mm
Large end	26	27	29	31	33	35 mm
Length	32	32	32	32	32	32 mm
Contents, approx.	50	45	40	38	35	30

Small end	35	38	41	44	47 mm
Large end	38	41	44	47	50 mm
Length	32	32	32	32	32 mm
Contents, approx.	25	20	15	12	11

***CV-015**

CORKS, as above, in packs of 120 assorted.

Pack	A	B	
Size range	6 to 26	12 to 38 mm	
10 each small end	6 to 20	12 to 24 mm	
5 each small end	21 to 26	26 to 38 mm	
10 packs	**£9·20**	**16·00**	cx
Pack	**£1·02**	**1·80**	

CV-050

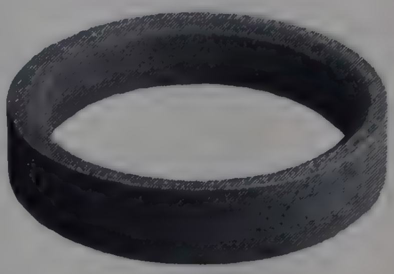
CORK SHEETS, COMPRESSED, 30×15 cm.

Thickness	3	6	13 mm	
10 sheets	**£0·65**	**0·75**	**1·55**	cx
Sheet	**£0·14**	**0·15**	**0·23**	

STOPPERS

SU-520	Borosilicate glass	**SU-780**	Neoprene
SU-700	Polypropylene	**SU-800**	Silicone rubber
SU-710		**SU-820**	*Suba-seal*
SU-712		**SU-850**	
SU-760	Natural rubber		
SU-765			

For details see entries in List No. sequence.



CV-070

CV-070

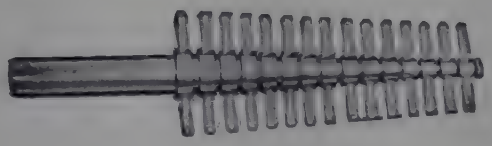
CORK RINGS, COMPRESSED, with mitred edge for supporting flasks, etc.

Dia.-external (approx.)	80	115	155	195	240 mm	
Dia.-internal (approx.)	45	80	115	155	195 mm	
Thickness	45	45	45	45	45 mm	
Ten	**£1·90**	**3·00**	**5·30**	**7·20**	**9·00**	cx
Each	**£0·25**	**0·36**	**0·59**	**0·80**	**1·00**	

CV-075

CORK RINGS, COMPRESSED, as CV-070, but in set comprising one of each size ... ... Set **£2·80** cx

CORK BORERS



CV-100

CV-100

CORK BORERS, safety pattern. The cutting tubes are hard soldered to the handles which are counter bored for additional safety. Each handle is numbered, No. 1 cutting a hole approximately 3 mm, each successive number being 1·5 mm larger, up to No. 16 cutting a hole approximately 27 mm. Nickel plated brass in sets complete with ejector.

Set of	8	12	16 borers	
Size Nos.	1—8	1—12	1—16	
Range approximately	3—14	3—21	3—27 mm	
Set	**£4·80**	**7·80**	**11·80**	cx

REPLACEMENT PARTS

CV-101 **Borers** as used in above sets supplied singly.

Size Nos.	1, 2, 3, 4, 5	6, 7 8, 9, 10	11, 12, 13, 14, 15, 16	
Each	**£0·80**	**1·05**	**1·25**	cx

CV-102 **Ejector** for use with above borers ... Each **£0·20** cx

CORK BORERS AND CUTTERS

CV-105

CORK BORERS, economy pattern, plated brass. The collar on each borer has a transverse hole in which the ejector rod is used as a tommy bar. Set of six for cutting holes 4 to 12 mm dia. with ejector.
10 sets **£21·00** Set **£2·35** *cx*

CV-110

CORK BORER SHARPENER, all metal construction for sharpening borers 3–27 mm dia.
Ten **£8·60** Each **£0·96** *cx*

CV-120

CORK BORING MACHINE, for drilling holes from 3 mm to 25 mm dia. in bark, compressed and rubber stoppers. With set of 15 nickel plated steel borers.
Each **£26·00** *cx*

REPLACEMENT PARTS

CV-121 **Borers,** steel, for above machine. The size number is the approx. dia. in sixteenths of an inch (1·5 mm).

No.	2, 3, 4, 5, 6	7, 8, 9, 10, 11	12, 13, 14, 15, 16	
Each	**£1·00**	**1·15**	**1·40**	cx

CV-122 **Borers,** set of 15, one of each size ... Set **£14·00** cx

CV-130

CORK PRESS, for compression softening of corks up to 38 mm dia. ... ... Each **£3·80** *cx*

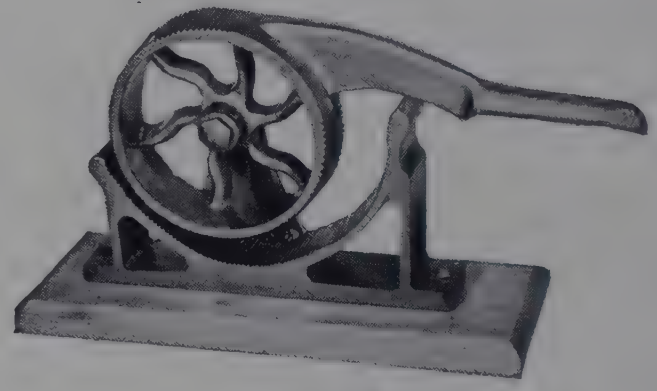
TT-160

KNIFE, for cutting cork. For details and price see entry in List No. sequence.

CV-105

CV-110

CV-120



CV-130

COTTON WOOL,
coloured } see CULTURE APPARATUS
white

COUNTERS

CV-800

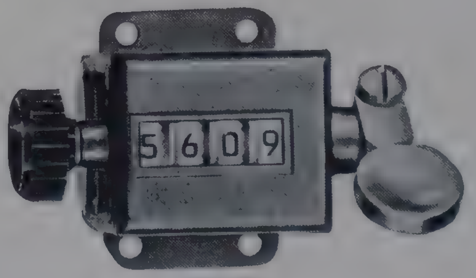
COUNTER, TALLY, registering to four figures. With thumb lever for manual operation. One complete turn of the reset knob returns all figures to zero.
Each **£2·49** *mx*

CV-830

COUNTER, TALLY, registering to four figures with zero reset control. With push button for manual operation, a chain retaining ring for location on the operator's finger and a plastics stand for bench mounting.
Each **£2·00** *mx*

CV-840

COUNTER, TALLY, 5-unit, each counter registering to four figures and with push button for manual operation. Rotation of end lever simultaneously resets each counter to zero. Overall dimensions 150 × 29 × 60 mm high.
Each **£18·50** *mx*



CV-800

CV-830 without stand

CV-840

COUNTER, colony see CX-300

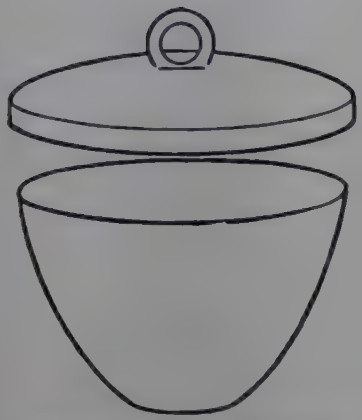
COUNTER, revolution see TB-020

COUNTING CHAMBERS,
haemacytometer see MD-200 et seq.

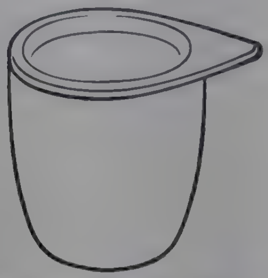
For full details see entries in List No. sequence.

CRUCIBLES

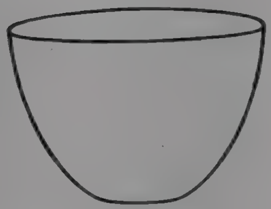
(All dimensions and capacities are nominal)



CW-210 with CW-212
CW-214 with CW-216
CW-250 with CW-252



CW-280 with CW-282



CW-300

PORCELAIN CRUCIBLES

CW-210

CRUCIBLES, *Royal Worcester* glazed **porcelain,** low form 103.

Size No.	000	00	0	1	2	3	
Capacity	8	15	19	28	50	80 ml	
Diameter	32	40	43	49	59	70 mm	
Height	19	22	25	30	38	45 mm	
Ten	**£0·70**	**0·85**	**0·90**	**1·25**	**1·60**	**2·00**	*mx*
Each	**£0·15**	**0·16**	**0·17**	**0·20**	**0·23**	**0·27**	

CW-212 **Covers,** porcelain, for CW-210.

For size	000	00	0	1	2	3	
Ten	**£0·55**	**0·55**	**0·65**	**0·85**	**0·95**	**1·30**	*mx*
Each	**£0·13**	**0·13**	**0·14**	**0·16**	**0·17**	**0·20**	

CW-214

CRUCIBLES, *Royal Worcester* glazed **porcelain,** medium form 140.

Size No.	00	0	1	
Capacity	11	16	32 ml	
Diameter	32	39	43 mm	
Height	25	29	37 mm	
Ten	**£0·70**	**0·90**	**1·50**	*mx*
Each	**£0·15**	**0·17**	**0·22**	

CW-216 **Covers,** porcelain, for CW-214.

For size	00	0	1	
Ten	**£0·50**	**0·65**	**0·65**	*mx*
Each	**£0·13**	**0·14**	**0·14**	

SILICA CRUCIBLES

CW-250

CRUCIBLES, *Vitreosil* glazed translucent **silica,** low form.

Capacity	10	15	25	50	80	150 ml	
Diameter	38	41	47	57	67	82 mm	
Height	19	25	28	37	45	51 mm	
Ten	**£5·80**	**6·20**	**6·80**	**7·80**	**11·00**	**13·60**	*fx*
Each	**£0·64**	**0·70**	**0·76**	**0·86**	**1·25**	**1·50**	

CW-252 **Covers,** silica, for CW-250.

For capacity	10	15	25	50	80	150 ml	
Ten	**£5·00**	**5·00**	**5·80**	**6·90**	**8·40**	**9·40**	*fx*
Each	**£0·55**	**0·55**	**0·64**	**0·78**	**0·94**	**1·04**	

CW-280

CRUCIBLES, *Vitreosil* glazed translucent **silica,** tall form.

Capacity	10	20	30	50	200 ml	
Diameter	27	35	43	51	73 mm	
Height	32	38	39	51	81 mm	
Ten	**£9·10**	**10·10**	**10·20**	**12·50**	**18·00**	*fx*
Each	**£1·02**	**1·14**	**1·14**	**1·40**	**2·00**	

CW-282 **Covers,** silica, for CW-280.

For capacity	10	20	30	50	200 ml	
Ten	**£4·50**	**4·50**	**4·70**	**5·00**	**8·60**	*fx*
Each	**£0·50**	**0·50**	**0·52**	**0·55**	**0·96**	

CW-300

CRUCIBLES, *Vitreosil* glazed translucent **silica,** with broad base.

Capacity	15	25	40 ml	
Diameter	41	48	57 mm	
Height	24	27	37 mm	
Ten	**£7·60**	**7·80**	**11·00**	*fx*
Each	**£0·84**	**0·86**	**1·25**	

CW-310

CRUCIBLES, *Vitreosil* glazed translucent **silica,** for gold assay.

Capacity	10	30 ml	
Diameter	30	42 mm	
Height	30	42 mm	
Ten	**£9·10**	**12·30**	*fx*
Each	**£1·02**	**1·35**	

For illustration see page 147.

CRUCIBLES

(All dimensions and capacities are nominal)

METAL CRUCIBLES

CW-330

CRUCIBLES, nickel, 99% pure.

Capacity	10	15	25	30	70	130 ml	
Diameter	25	30	35	40	50	60 mm	
Height	24	29	34	38	48	58 mm	
Ten	£3·20	3·40	4·10	4·40	7·00	9·60	cx
Each	£0·38	0·40	0·46	0·49	0·78	1·06	

CW-332 **Covers,** nickel, for CW-330.

For capacity	10	15	25	30	70	130 ml	
Ten	£1·30	1·40	1·80	1·90	2·25	3·20	cx
Each	£0·20	0·21	0·25	0·25	0·29	0·38	

CW-340

CRUCIBLES, platinum, with covers. Quoted weights include cover.

Capacity	10	15	20 ml	
Diameter	26	29	34 mm	
Height	27	32	34 mm	
Approx. wt.	11	16	21 g	
Each	£42·00	59·00	73·00	fxN

Capacity	25	30	40 ml	
Diameter	35	38	42 mm	
Height	36	39	44 mm	
Approx. wt.	25	30	40 g	
Each	£85·00	100·00	130·00	fxN

Capacity	50	75	100 ml	
Diameter	47	53	56 mm	
Height	46	53	57 mm	
Approx. wt.	49	67	95 g	
Each	£156·00	208·00	292·00	fxN

CW-360

CRUCIBLES, sheet iron, with cover.

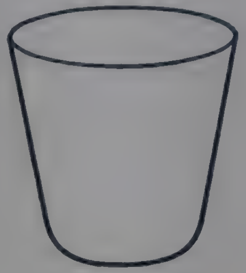
Capacity	45	200 ml	
Diameter	45	80 mm	
Height	45	60 mm	
Ten	£6·40	9·40	cx
Each	£0·72	1·04	

PLUMBAGO CRUCIBLES

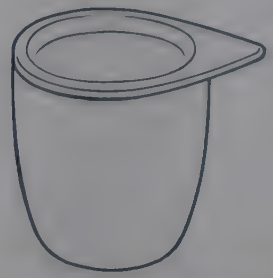
CW-400

CRUCIBLES, Salamander plumbago, 'A' shape, with pouring lip.

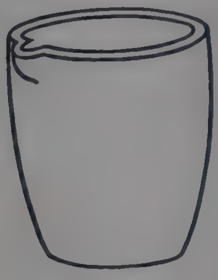
Capacity	190	320	680 ml	
Top dia.	79	95	114 mm	
Base dia.	56	62	76 mm	
Height	97	109	141 mm	
Each	£0·85	1·25	2·10	cx



CW-310



CW-330 with CW-332, CW-340, CW-360



CW-400

Gallenkamp FURNACES

for heating Crucibles

Muffle furnaces, maximum temperature 1100°C, electrically heated—see FR-510 to FR-614.

Box furnaces, maximum temperature 1500°C, electrically heated—see FR-645 to FR-770.

Davies pattern, maximum temperature 1000°C, for gas heating—see FT-110.

Asbestos gloves—see CP-770/775.

Desiccators —see DK-430 et seq.

Tongs —see TS-212 et seq.

Triangles —see TV-540.

For full details and prices of above see entries in List No. sequence.

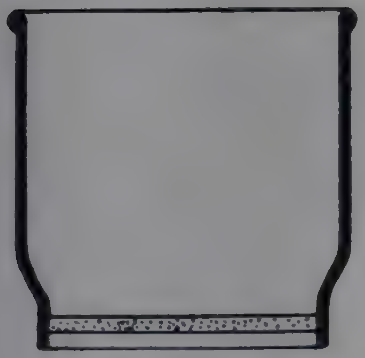
SINTAGLASS FILTER CRUCIBLES

Manufactured in our own factory under accurately controlled conditions.

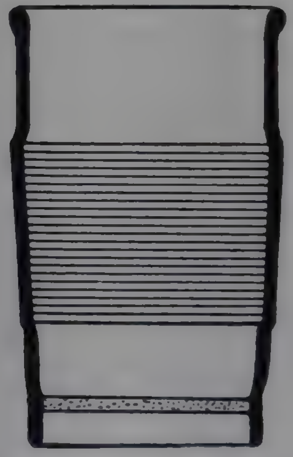
- **Close tolerance porosity ranges**
- **Colour coded for porosity**
- **Non-friable sintered plates**
- **Made from borosilicate glass**
- **Reinforcing rim at top**

Porosity	Code colour	*Sintaglass*, range of maximum pore dia.
		µm
0	White	200 – 250
1	Yellow	100 – 120
2	Green	40 – 50
3	Black	20 – 30
4	Orange	5 – 10
5	Blue	1 – 1·8

For other useful information see data on pages headed Sintered Glassware.



CW-481 to CW-515



CW-521 to CW-535

DRYING AND IGNITION

Sintered crucibles are specially suitable for precipitates which have to be dried to constant weight at 110°C. They can be used with boiling liquids, placed directly in a drying oven up to 150°C, and then left to cool in a desiccator or in the open air. When ignition is required an electric furnace is necessary. The crucibles should be placed in the cold furnace, slowly heated to a temperature not exceeding 580°C and allowed to cool down below 200°C before removal from the furnace. In the case of filters with porosity 5 plates, greater care is needed when heating, especially when the filter plate is wet. These filters should always be placed in a cold oven and heated gradually, since the sudden evolution of steam from the fine pores may set up sufficient pressure within the filter to disrupt it.

CRUCIBLES, *Sintaglass*, A stable crucible with a short skirt below the filter plate. Forms an excellent fit with funnels CW-720 and rings CW-725.

Capacity, approx	8	15	35	70 ml	
Plate diameter	15	20	30	40 mm	
Ht.	35	40	45	50 mm	
Weight, approx	8	15	25	35 g	
Porosity	List Numbers				
1	**CW-481**	**CW-491**	**CW-501**	**CW-511**	
2	**CW-482**	**CW-492**	**CW-502**	**CW-512**	
3	**CW-483**	**CW-493**	**CW-503**	**CW-513**	
4	**CW-484**	**CW-494**	**CW-504**	**CW-514**	
Ten	£4·30	4·40	5·30	5·60	*ax*
Each	£0·48	0·49	0·59	0·62	
Porosity					
5	**CW-485**	**CW-495**	**CW-505**	**CW-515**	
Ten	£11·00	12·80	13·60	17·00	*ax*
Each	£ 1·25	1·45	1·50	1·90	

CRUCIBLES, *Sintaglass*, with standard cone joint. For use with adapters CW-760. Rubber adapters not required.

Capacity, approx	20	50 ml	
Plate diameter	20	30 mm	
Ht.	55	65 mm	
Weight, approx	25	35 g	
Cone	29/22	40/25	
Porosity	List Numbers		
1	**CW-521**	**CW-531**	
2	**CW-522**	**CW-532**	
3	**CW-523**	**CW-533**	
4	**CW-524**	**CW-534**	
Ten	£12·60	13·60	*ax*
Each	£ 1·40	1·50	
Porosity			
5	**CW-525**	**CW-535**	
Ten	£20·00	23·00	*ax*
Each	£2·25	2·55	

FILTER CRUCIBLE FITTING CHART

The following chart indicates the appropriate funnel and rubber adapter sizes required for particular crucibles when used in the various assemblies illustrated below.

Crucible		Assembly Fig. 1		Assembly Fig. 2		Assembly Fig. 3	
List No. and type	Capacity ml	Funnel CW-720 with Size No.	Adapter CW-725 Size No.	Funnel CW-720 with Size No.	Adapter CW-745 Size No.	Funnel CW-720 with Size No.	Adapter CW-750 Size No.
CW-481 to CW-515 Sintered glass	8	C	1	B	2	—	—
	15	C	3	C	3	—	—
	35	D	6	D	4	—	—
	70	E	7	—	—	—	—
CW-550 Porcelain	10	C	2	B	2*	B	2
	25	D	5	C	3*	C	3
	35	E	5	D	4	D	4
CW-570 Silica	15	C	3	B	2*	—	—
	25	D	4	C	3*	—	—
	35	D	5	D	4	—	—
CW-640/1/2 Alumina	20	C	3	C	3*	C	3
	30	D	5	D	4	D	4
CW-650 Porcelain	25	D	4	C	3*	C	3
	34	D	5	D	4	D	4
CW-681/2/3/4 Silica	30	D	4	C	3	C	3
	50	D	6	C	3	D	4

*In these instances the lower end of the rubber adapter will project below the base of the crucible and may be cut off if desired to avoid contact with the filtrate.

SPECIMEN ASSEMBLIES FOR FILTER CRUCIBLES

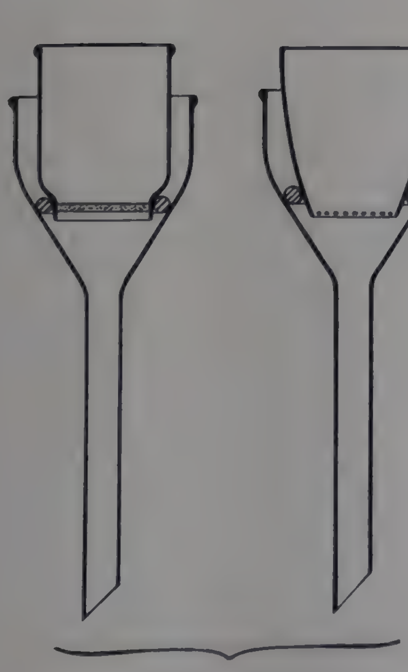


Fig. 1
Rubber ring
CW-725
with funnel
CW-720

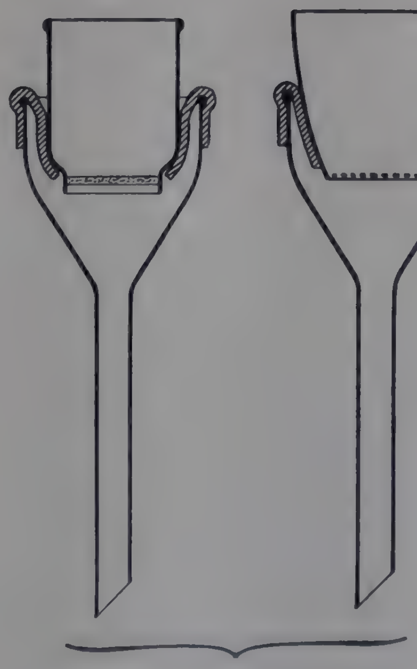


Fig. 2
Rubber cone
CW-745
with funnel
CW-720

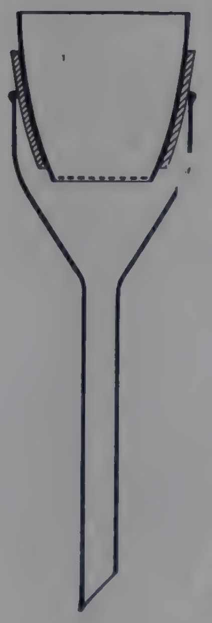


Fig. 3
Rubber cone
CW-750
with funnel
CW-720

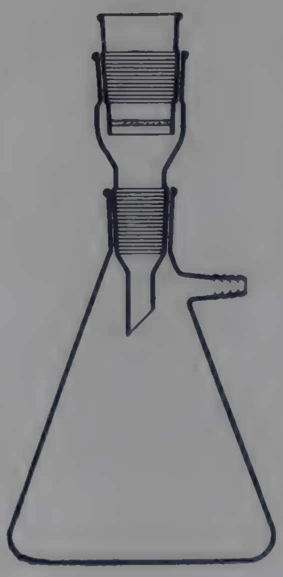


Fig. 4
Joint adapter
CW-760
with flask
FJ-290 or
Q-FB 500/3

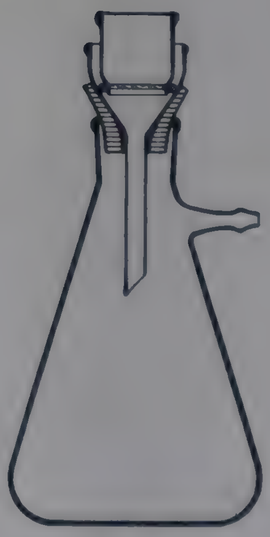
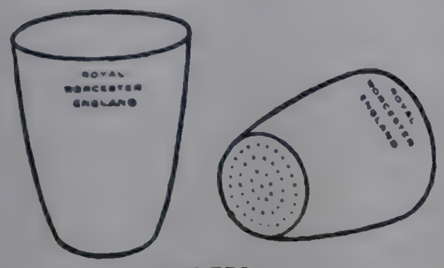
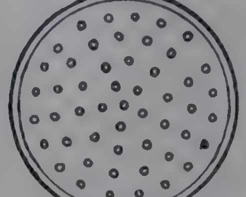


Fig. 5
Rubber ring
CW-725
with funnel
CW-720
and adapter
CW-722

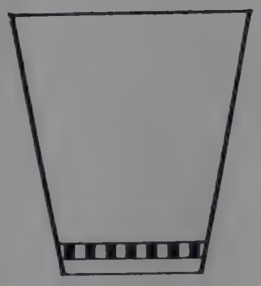
GOOCH FILTER CRUCIBLES



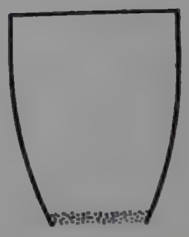
CW-550



CW-552



CW-570



CW-650

PERFORATED BASE

CW-550

CRUCIBLES, FILTER, Gooch, *Royal Worcester* **porcelain,** with perforated base.

Capacity	10	25	35 ml	
Top dia.	29	36	42 mm	
Height	31	40	45 mm	
Ten	**£2·00**	**2·50**	**2·75**	*mx*
Each	**£0·27**	**0·31**	**0·34**	

CW-552 **Filter disks,** for CW-550.

Diameter	15	20	23 mm	
Ten	**£1·00**	**1·15**	**1·15**	*mx*
Each	**£0·17**	**0·19**	**0·19**	

CW-570

CRUCIBLES, FILTER, Gooch, *Vitreosil* **silica,** translucent with perforated base.

Capacity	15	25	35 ml	
Top dia.	34	40	45 mm	
Base dia.	23	25	27 mm	
Height	34	40	45 mm	
Ten	**£32·40**	**33·80**	**37·30**	*fx*
Each	**£ 3·70**	**3·80**	**4·20**	

For suitable Gooch asbestos see AR-460 in List No. sequence.

POROUS FILTER BASE

CRUCIBLES, FILTER, Gooch, porous alumina, with curved sides. In three porosities.

CW-640 Coarse porosity. (20–30 μm).
CW-641 Medium porosity. (10–15 μm).
CW-642 Fine porosity. (<5 μm).

Capacity	20	30 ml	
Top dia.	35	41 mm	
Base dia.	21	24 mm	
Height	38	43 mm	
Ten	**£6·70**	**8·20**	*fx*
Each	**£0·76**	**0·92**	

CW-650

CRUCIBLES, FILTER, *Royal Worcester* **porcelain,** for filtration of fine precipitates and subsequent ignition. With porous base to BS 1752, porosity 4.

Capacity	25	34 ml	
Top dia.	35	40 mm	
Height	40	43 mm	
Each	**£0·53**	**0·57**	*mx*

VITREOSIL FILTER AND IGNITION CRUCIBLES

For filtration and subsequent ignition at temperatures up to 1000°C. Available in four porosity grades covering filtration from coarse precipitates to analytical work with very fine precipitates.

Porosities 1 to 4 in accordance with the pore sizes specified in BS 1752.

CRUCIBLES, FILTER and IGNITION, *Vitreosil* **silica,** tall (platinum) shape with porous base.

Capacity	30	50 ml
Top dia.	38	47 mm
Disk dia.	23	30 mm
Height	44	51 mm

CW-681	Porosity No. 1	Each	**£3·70**	**5·10**	*fx*
CW-682	Porosity No. 2	Each	**£3·95**	**5·60**	*fx*
CW-683	Porosity No. 3				
CW-684	Porosity No. 4	Each	**£4·10**	**5·80**	*fx*

SPECIMEN ASSEMBLIES of filter crucibles with adapters and funnels see page 149.

GOOCH FUNNELS AND RUBBER ADAPTERS

CW-720

FUNNELS, Ⓐ, **borosilicate glass,** for use with filter crucibles as shown in table on page 149.

Size No	B	C	D	E	
Int. dia.	29	33	43	53 mm	
Ten	£3·20	3·40	3·70	5·30	*ax*
Each	£0·38	0·40	0·43	0·59	

CW-722

FLASK ADAPTER, rubber, *Gallenkamp.* A pliable, moulded rubber sleeve which fits on the conical part of Gooch crucible adapters and small Buchner funnels. The sleeve then makes a vacuum-tight joint with the rim of a filter flask so avoiding the use of a bored stopper. Convenient and economical—will not adhere to the funnel or flask—can be used again and again.

Suitable for use with:

List No.	Description	Sizes
CW-720	Gooch funnels	All
FM-601 to **FM-624**	Sintered glass funnels	
FM-631 to **FM-644**	Sintered glass funnels	
FP-460	Slit sieve funnel	
FP-495	Porcelain funnels	65 and 82 mm dia.
FP-510	Porcelain funnels	65 to 116 mm

Ten **£0·90** Each **£0·16** *bx*

CW-725

RUBBER RING ADAPTERS, precision moulded, nitrile synthetic rubber, for use with filter crucibles in funnels CW-720 as shown in table on page 149. In packs of 10.

Size No.	1	2	3	4	
Int. dia.	17	21	23	25 mm	
10 packs	£8·20	8·20	8·20	8·20	*cx*
Pack	£0·92	0·92	0·92	0·92	

Size No.	5	6	7	
Int. dia.	29	33	43 mm	
10 packs	£9·00	9·40	9·40	*cx*
Pack	£1·00	1·04	1·04	

CW-745

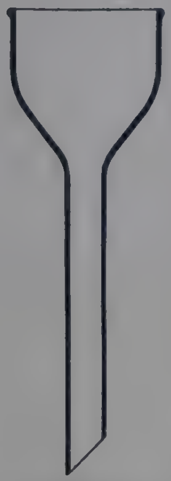
RUBBER CONES, for use with filter crucibles.

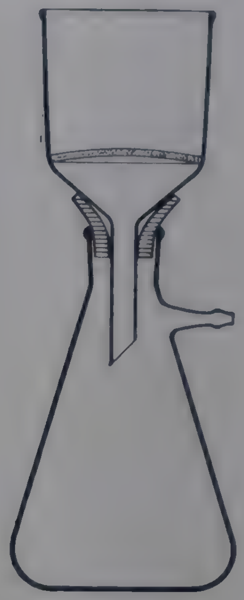
Size No.	2	3	4	
Int. dia., large end	30	40	50 mm	
Int. dia., small end	20	25	30 mm	
Length	40	45	50 mm	
Ten	£1·75	2·00	2·60	*cx*
Each	£0·24	0·27	0·32	

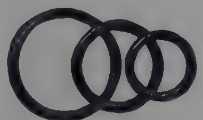
CW-750

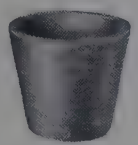
RUBBER CONES, moulded to shape of crucible, for use with filter crucibles. In packs of 10.

Size No.	2	3	4	
Int. dia., large end	27	34	40 mm	
Int. dia., small end	19	24	36 mm	
Length	25	31	35 mm	
10 packs	£1·85	1·90	1·95	*cx*
Pack	£0·25	0·26	0·26	


CW-720


CW-722 in use with FM-640


CW-725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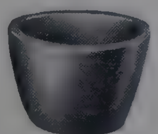
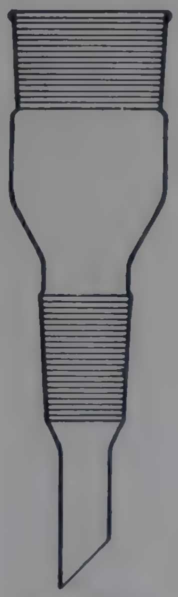

CW-750


CW-760

CW-760

CRUCIBLE ADAPTERS, Ⓐ standard joint, **borosilicate glass,** for use with sintered glass crucibles CW-521 to CW-535.

Socket	29/22	40/25	40/25	
Cone	24/29	24/29	29/32	
Ten	£9·60	11·60	13·60	*ax*
Each	£1·06	1·30	1·50	

CRYOSCOPE see **MW-020** in List No. sequence.

CULTURE APPARATUS

SECTION INDEX

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- Anaerobic jars 158
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- Colony counter, *Gallenkamp*... 154
- Continuous culture apparatus, *Gallenkamp* ... 160
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- Cotton wool 157
- Culture bottles 152
  - flasks 156
  - jars 158
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- Needle holder 158

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- Roux flasks 156
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- Universal containers 152
- Wire holder 158

Other useful equipment will be found under the following headings:

- Autoclaves
- Filters, bacteriological
- Histology
- Incubators
- Manipulator boxes
- Microscopes
- Ovens
- Sterilizers
- Water baths
- Water and chemical pumps

BOTTLES

CX-200

BOTTLES, McCartney, glass, with narrow neck and aluminium screw cap with rubber liner. Can be autoclaved.

Capacity	7	14 ml	
Pack qty.	288	288	
Each	£11·75	12·20	*cx*

REPLACEMENT PARTS

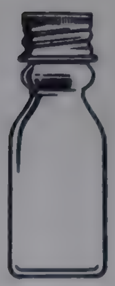
BT-335 **Caps,** aluminium, R3/20, with rubber liner ... ...
BT-342 **Caps,** polypropylene, R3/20 ...
} For prices see entries in List No. sequence.

CX-210

BOTTLE, McCartney, glass, capacity 28 ml. With medium neck and aluminium screw cap with rubber liner. Can be autoclaved. In pack of 144 ... Pack **£6·80** *cx*

REPLACEMENT PARTS

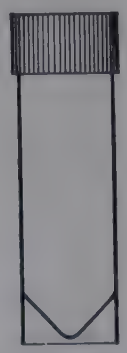
BT-335 **Caps,** aluminium, R3/22, with rubber liner ... ...
BT-342 **Caps,** polypropylene, R3/22 ...
} For prices see entries in List No. sequence.



CX-200

CX-210

CX-220



CX-230

CX-215

BOTTLE, as CX-210 but with 4 mm hole in centre of metal cap to permit withdrawal of contents by using a hypodermic needle to puncture the rubber liner. In pack of 144 ... ... Pack **£7·70** *cx*

REPLACEMENT PARTS

CX-216 **Caps** with centre hole, fitted with rubber liner. In pack of 25 ... Six packs **£3·30** Pack **£0·60** *cx*

CX-220

BOTTLE, universal container, glass, capacity 28 ml. Cylindrical with wide neck and aluminium screw cap with rubber liner. Can be autoclaved. In pack of 144. Pack **£7·80** *cx*

REPLACEMENT PARTS

BT-335 **Caps,** aluminium, R3/28, with rubber liner ... ...
BT-342 **Caps,** polypropylene, R3/28 ...
} For prices see entries in List No. sequence.

CX-230

BOTTLE, universal container, clear polystyrene, expendable, capacity 25 ml. Cylindrical with wide neck and polypropylene screw cap which seals without the use of a separate insert. In pack of 10.
25 packs **£4·90** Pack **£0·27** *mx*

ACCESSORIES

CJ-335 **Rubber cushion,** for using CX-230 in 50 ml centrifuge bucket. For price see entry in List No. sequence.

SR-772

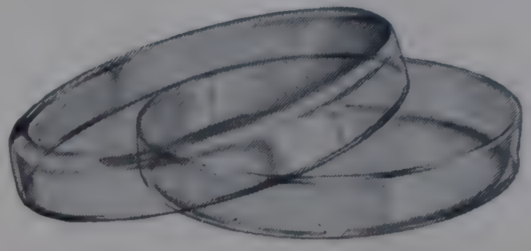
STERILIZING RACK for 28 ml McCartney bottles and universal containers. For price see entry in List No. sequence.

DISHES

CX-240

DISHES, PETRI, expendable, clear polystyrene. These biologically inert dishes have an excellent uniform finish. They may be used for any standard culturing techniques and then discarded, so dispensing with the usual washing, autoclaving and storage procedures and eliminating the high running costs of replacing broken glass Petri dishes. The lids are slightly recessed for safe stacking. In packs of 10.

Diameter	50	90 mm	
Depth including lid	13	15 mm	
50 packs	**£9·40**	**7·40**	*mx*
Pack	**£0·28**	**0·23**	



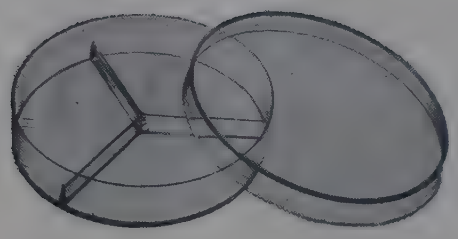
CX-240, CX-250
CX-242, CX-270

***CX-242**

DISH, PETRI, expendable, water wettable, non-toxic clear polystyrene, 50 mm dia. Both components being precision moulded, the lid rests closely on the dish giving an almost airtight closure. In pack of 10.
40 packs **£16·00** Pack **£0·48** *mx*

***CX-244**

DISH, PETRI, as CX-242 but with spacers moulded on underside of lid, for use where tight closure is not required. In pack of 10.
40 packs **£16·00** Pack **£0·48** *mx*



CX-246

CX-246

DISH, PETRI, expendable, clear polystyrene, 90 mm dia. with base subdivided into three equal compartments.
In pack of 10 ... 50 packs **£10·20** Pack **£0·28** *mx*

LABELLING TAPE, self adhesive, legend 'STERILE' see LB-150

STERILISING BOX, for resistant glass Petri dishes see SR-520

For details and prices see entries in List No. sequence.

CX-250

DISH, PETRI, resistant flint glass, 100 mm dia., conforming in all respects to BS 611.
70 **£16·00** Ten **£2·50** Each **£0·31** *cx*

CX-270

DISHES, PETRI, *Pyrex* glass, dish height 18 mm.

Dish dia.	52	63	70	95	115	141 mm	
Cover dia.	57	70	76	101	122	149 mm	
Std. pack qty.	72	72	72	72	24	24	
Std. pack	**£24·90**	**24·90**	**27·40**	**32·60**	**13·45**	**17·30**	*x*
Dozen	**£ 4·50**	**4·50**	**5·00**	**5·90**	—	—	
Each	**£ 0·43**	**0·43**	**0·47**	**0·55**	**0·64**	**0·84**	

Olympus INVERTED MICROSCOPES

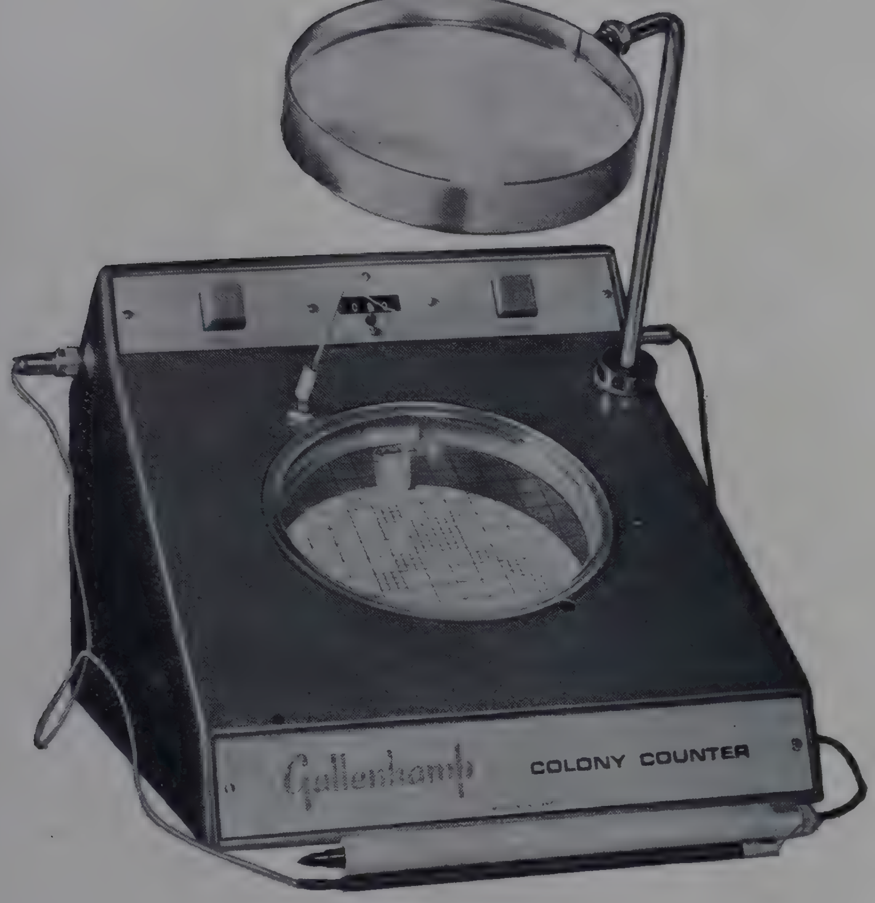
For routine examination of cultures in bottles, dishes or tubes.

- **Monocular or binocular head**
- **Image appears upright**
- **Phase contrast and polarising accessories**

For full details see ML-280 et seq. in List No. sequence.

Gallenkamp COLONY COUNTER

A compact and accurate colony counter for counting bacterial and mould colonies in biology, botany, zoology, bacteriology, pathology and public health laboratories.



CX-300 with CX-314
and CX-318

The MAINS switch controls the supply of electricity to all circuits and the LAMP switch controls the built-in circular fluorescent lamp. Both switches are push type which light up when ON.

For contact counting, the flip-over stationary electrode and the manual needle probe are used. These two contacts complete a circuit through the medium, causing the counter to operate once each time the manual probe is made to touch the medium or a colony. The electrical resistance of the medium can be up to 10 KΩ which permits most common media to be used. Both the electrode and probe needles are easily detachable for sterilising.

For counting through the lid or base of the dish, the marker probe alone is used. This contains a replaceable fibre-tipped pen (available in several colours for sequence counting and coding) and a sensitive microswitch to complete the counter circuit. Using normal writing pressure, the counter operates each time a mark is made on the dish.

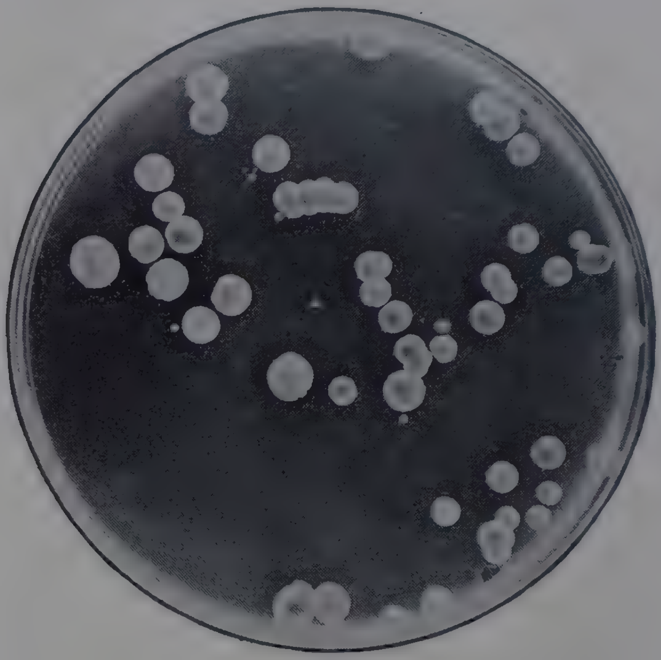
The pen cartridges are fitted with a non-smear quick drying ink specially selected for writing on glass and plastics.

- **High sensitivity probe for direct contact counting**
- **Marker probe for counting in closed dishes**
- **Coloured marker probe inserts for coding sequential counts**
- **Hand held push switch accessory for sparsely populated dishes and remote counting operations**
- **Interchangeable probe sockets for right and left handed operators**
- **Contact needles easily removed for sterilising—holder fitted for spare needles**
- **Solid state counting circuit for long term reliability**
- **Digital display of up to 9999 colony counts**
- **Bright but glare-free peripheral illumination reduces operator fatigue**
- **Colonies clearly defined against light or dark backgrounds**
- **Easily cleaned outer case remains cool during prolonged counting**
- **Sloping front provides comfort during prolonged counting**
- **Full view 2X magnifier accessory facilitates counting of small colonies**
- **Wolffhuegel guide plate available**
- **Removable dish holder 12·4 cm diameter**
- **Accessory set of rings to accommodate smaller Petri dishes**

Gallenkamp COLONY COUNTER

CONCEALED PERIPHERAL FLUORESCENT ILLUMINATION with optional dark field provides the operator with ideal counting conditions:

- Complete freedom from dazzle prevents eye strain and the resulting fatigue.
- Small or uncoloured colonies, which 'disappear' when illuminated by the traditional tungsten filament lamp and opal diffuser, show up clearly on the *Gallenkamp* Colony Counter—see photograph.



CX-300

COLONY COUNTER, *Gallenkamp*, as specification with solid state, digital read-out counting circuit, peripheral fluorescent illumination, provision for light and dark ground viewing and sockets for right and left handed operation. Includes 12·4 cm dia. dish holder, needle probe, hinged contact probe, steriliser well and marker probe with black insert pen.

For 220/240V 50 Hz supplies	Each	**£90·00**	*bx*
For 200/210V 50 Hz supplies	Each	**£92·00**	*bxN*
For 100/120V 50 or 60 Hz supplies ...	Each	**£92·00**	*bxN*

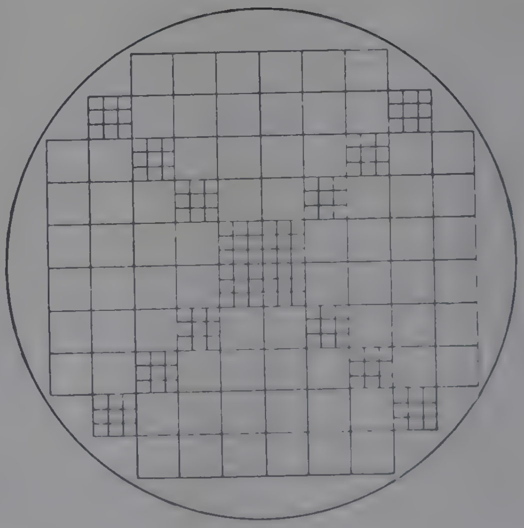
When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

CX-305	**Pens,** fibre-tipped, spare for marker probe. Pack containing 3 black, 3 red, 3 blue and 3 green.	Pack	**£2·50**	*bx*
CX-306	**Dish holder,** moulded acrylic ...	Pack of 5	**£3·75**	*bx*
CX-308	**Circular fluorescent lamp** (all voltages).	Each	**£1·80**	*mx*
CX-309	**Needles,** pack containing 10 probe needles and 10 needles for hinged contact	Pack	**£1·10**	*bx*

ACCESSORIES

CX 312	**Adapter rings.** A set of four transparent plastics rings, diameters 57·5, 70·5, 76·5 and 101·5 mm which enable smaller sizes of Petri dishes to be mounted centrally in the dish holder	Set	**£2·25**	*bx*
CX 314	**Graticule,** Wolffhuegel pattern. clear acrylic 12 cm dia. with black filled $1\ \text{cm}^2$ grid. To fit dish holder.	Each	**£3·00**	*bx*
CX-316	**Push-button hand switch** for counting operations not requiring probes. With lead and plug.	Each	**£2·70**	*bx*
CX-318	**Magnifying lens** ×2. Dia. 13 cm with movable arm for mounting on the colony counter case.	Each	**£11·50**	*bx*
CX-240 et seq.	**Petri dishes.** For details and prices see entries in List No. sequence.			

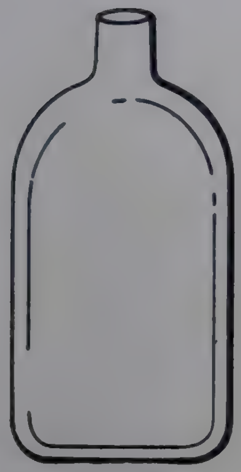


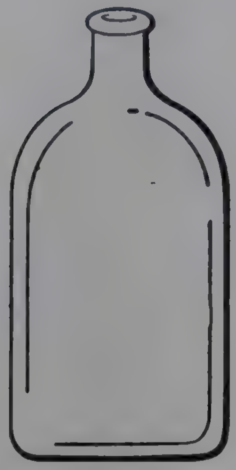
CX-314

Bibliography

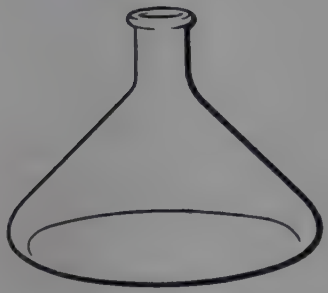
'An electric colony counter', W. D. Linsell, M.D. Lond., F.C.Path., *Journal of Clinical Pathology*. 1953. p. 91, vol. 6.

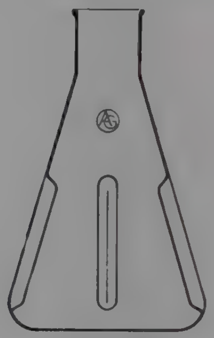
FLASKS


CX-325


CX-330

ORBITAL SHAKING INCUBATORS
See IH-460 et seq. in List No. sequence.


CX-350


CX-380

CX-325

FLASK, Roux, *Pyrex* glass, 1000 ml, with central neck.
Std. pack of 12 **£9·85** Each **£0·92** *jx*

CX-330

FLASK, Roux, *Pyrex* glass with offset ring neck, 1000 ml.
Std. pack of 12 **£14·95** Each **£1·40** *jx*

CX-350

FLASK, conical, *Pyrex* glass, 1000 ml.
Std. pack of 12 **£9·85** Each **£0·92** *jx*

CX-380

CULTURE FLASKS, Ⓐ, **borosilicate glass, conical, narrow neck, fluted,** with four indents down the length of the wall. When used on orbital shaking platforms or in orbital shaking incubators these indents break up the regular swirling action of the contents, discourage vortex formation and promote mixing even at relatively low speeds. At higher orbiting speeds aeration is greater than with plain walled conical flasks and this can result in increased yield rates.

Capacity	500	1000	2000 ml	
Ten	£14·00	22·00	30·00	*ax*
Each	£ 1·55	2·45	3·30	

FJ-065

FLASKS, conical, with screw cap. For details and price see entry in List No. sequence.

Q-FV500
Q-FV1L
CULTURE VESSELS. For details and prices see entries in *Quickfit* section.

Gallenkamp OVEN/STERILISER, 250°C

To BS 3421

(Performance of electrically heated sterilising ovens)

- **Accurate temperature control by direct reading** *Compenstat*
- **Safety thermostat for additional protection**
- **Capacity 210 litres (7·5 ft³)**
- **Fan convection ensures temperature uniformity even at full load**
- **Stainless steel interior designed for easy cleaning**

For details see OV-420 in List No. sequence.

See OVENS for the range of *Gallenkamp* **sterilising and drying ovens.**

TUBES

CX-400

TUBES, culture, borosilicate glass, with plain rimless neck selected to be closed by *Oxoid* caps CX-450. Size 150×16 mm. In pack of 72 ... Pack **£2·64** *mx*

CX-450

CAPS, *Oxoid*, aluminium, for closing necks of culture tubes. Nominal size $\frac{5}{8}$ in. Internal dia. 16·2 mm. Natural finish. In pack of 10.
10 packs **£2·60** Pack **£0·32** *cx*

***CX-465**

TUBES, tissue culture, expendable, made from **water wettable, non-toxic** clear polystyrene, 115×14 mm dia. Fitted with airtight screw cap. In pack of 50.
8 packs **£22·00** Pack **£3·00** *mx*

CX-470

TUBES, tissue culture, Leighton, neutral glass, tube approximately 125 mm length×16 mm diameter without rim, with flat rectangular enlargement approximately 40×12 mm in wall at closed end. Indentation retains medium in use. The tube permits simultaneous preparation of a matrix culture and a 'flying coverslip' culture in the same tube. The matrix culture can, moreover, be examined without optical distortion by the wall of the tube. Ref.: J. Leighton (1954) 'The Growth Patterns of some Transplantable Animal Tumours in Sponge Matrix Tissue Culture', J. Nat. Cancer Inst. **15,** 273. In pack of 48.
Pack **£13·70** *cx*

CX-472

TUBES, tissue culture, Leighton, as CX-470, but with plastics screw cap with rubber liner packed separately. Tube and cap can be autoclaved at 121°C. In pack of 48 ... ... Pack **£16·30** *cx*

REPLACEMENT PART

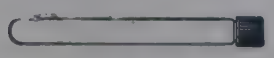
CX-473 Cap, with rubber liner. In pack of 50.
10 packs **£9·00** Pack **£1·00** *cx*

CX-474

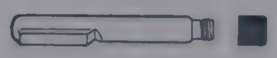
COVER SLIP, rectangular shape 35×9·5 mm, No. $1\frac{1}{2}$, 0·16–0·19 mm thick, suitable for use with tubes CX-470 and CX-472. In pack of 100.
10 packs **£3·70** Pack **£0·43** *mx*

CX-480

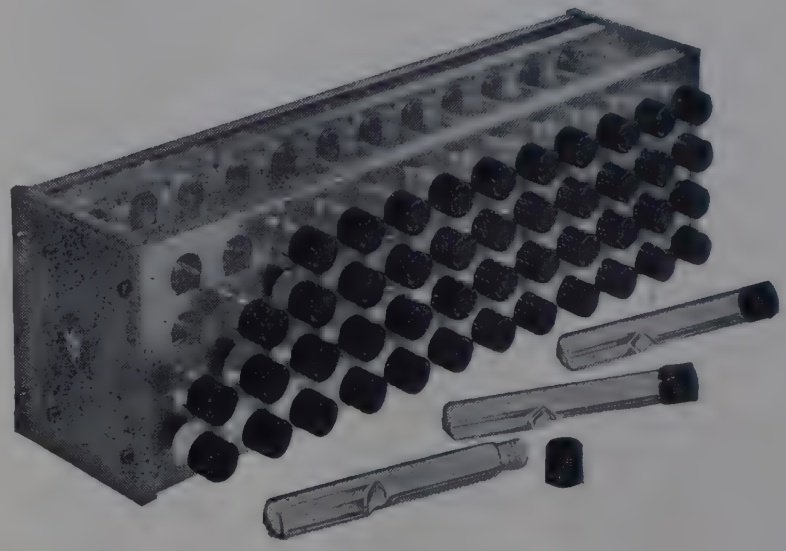
TUBE RACK, tissue culture. Anodised aluminium rack to hold 48 Leighton tubes horizontally in 4 layers. A self-locking feature ensures correct tube location and allows rack to be tilted for emptying tubes simultaneously. Supplied packed flat, the rack is quickly assembled using a screwdriver ... ... Each **£12·40** *cx*



CX-465



CX-472



CX-480 with CX-472

BACTERIOLOGICAL GRADE TEST TUBES

TF-104 Soda-lime glass.

TF-128 Neutral resistance glass.

For full details and prices see entries in List No. sequence.

COTTON WOOL

CX-485

COTTON WOOL, non-absorbent, available in following colours. In pack of 0·5 kg:

- Blue-dark
- Blue-light
- Green-dark
- Green-light
- Mauve
- Pink
- Red
- Yellow

When ordering please specify colour ... Pack **£1·05** *cx*

CX-486

COTTON WOOL, non-absorbent, white. In pack of 0·5 kg ... ... 10 packs **£9·40** Pack **£1·04** *cx*

CX-487

COTTON WOOL, absorbent, white. In pack of 0·5 kg ... ... 10 packs **£6·00** Pack **£0·66** *cx*

AL-100 et seq.
Aluminium foil
PP-522 et seq.
Parafilm
PP-525 et seq.
Sealing tape, ptfe

} Suitable for closure of culture tubes and flasks, see entries in List No. sequence.

Gallenkamp

CX-500

CX-500

CULTURE JAR, ANAEROBIC, *Gallenkamp*, **modified McIntosh & Fildes pattern,** for the safe growth of anaerobes by utilising a catalyst which is active above 0°C. The heavy glass jar 23 cm high × 15 cm dia. has its top surface ground flat, and the metal cover fitted with a toroidal sealing ring is held in place by a strong bridge clamp by hand tightening only. The cover is fitted with two needle valves for evacuation and filling, and a sachet containing the catalyst. Complete with instructions. Each **£16·50** *bx*

REPLACEMENT PARTS

CX-502	**Glass jar** only, for above	Each	**£2·05**	*cx*
CX-504	**Sealing ring**	Each	**£0·70**	*bx*
CX-522	**Catalyst,** see entry below.			

CX-520

CX-520

CULTURE JAR, ANAEROBIC, modified McIntosh & Fildes pattern, all metal construction, comprising a spun jar with a top flange recessed for a toroidal rubber sealing ring and a cover held in place by a strong bridge clamp. The cover is fitted with two needle valves for evacuation and filling, and a sachet containing a room temperature catalyst. A sidearm on the jar is connected to a glass tube containing semi-solid Lucas indicator. The inner surfaces are plated to resist corrosion and the outside is stove enamelled ... ... Each **£22·11** *fx*

REPLACEMENT PARTS

CX-522	**Catalyst,** in monel sachet, for CX-500 and CX-520. In pack of 3	10 packs	**£16·00**	Pack	**£1·82**	*fx*
CX-524	**Lucas indicator,** in glass tube.	Ten	**£5·50**	Each	**£0·61**	*fx*
CX-526	**Sealing ring** ...	Ten	**£2·80**	Each	**£0·30**	*fx*

CX-560

NEEDLE AND WIRE HOLDER, with brass chuck and light aluminium handle, 20 cm long, also suitable for holding platinum wire for blowpipe flame analysis. Will accept wire up to 0·635 mm dia. ... Each **£0·30** *cx*

CX-570

PLATINUM-IRIDIUM WIRE, 10% platinum alloy, 0·5 mm dia. ... Per 10 cm (minimum) **£2·30** *cx*

CX-560

CUPBOARDS, apparatus
fume } see FURNITURE
poison
first aid see FIRST AID

CYLINDERS, gas see GAS CYLINDERS
hydrometer see HYDROMETERS
Nessler see COLORIMETERS

Gallenkamp LOOP FLAMING INCINERATOR

CX-600

LOOP FLAMING INCINERATOR, *Gallenkamp.* A simple but essential device for flame-sterilising platinum loops without the danger of scattering infective material such as bacteria or mould spores. Comprises a batswing burner in a heat resistant finished steel hood mounted on a heavy metal base for stability. The loop is inserted through the slit on the side of the case and can be observed in the flame through the mica window. The cover is a removable perforated copper disk. Dia. 8 cm, height 18 cm ... ... Each **£8·75** *bx*

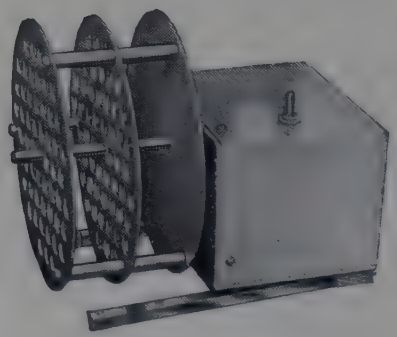
CX-600

CX-610

ROLLER TUBE CULTURE APPARATUS, for virus tissue culture and similar applications. The anodised dural drum accommodates 54 test tubes 12·5 mm dia. and is rotated by an a.c. motor at 12 rev per hour. Power consumption is less than 2W. Adjustable tilt ensures that the medium is sloped away from the open ends of the tubes.

Overall dimensions with drum 22·5×18×18 cm high. Weight, net 2 kg. For 200/250V 50 Hz supplies.

Each **£20·00** *fx*



CX-610

Gallenkamp INCUBATORS

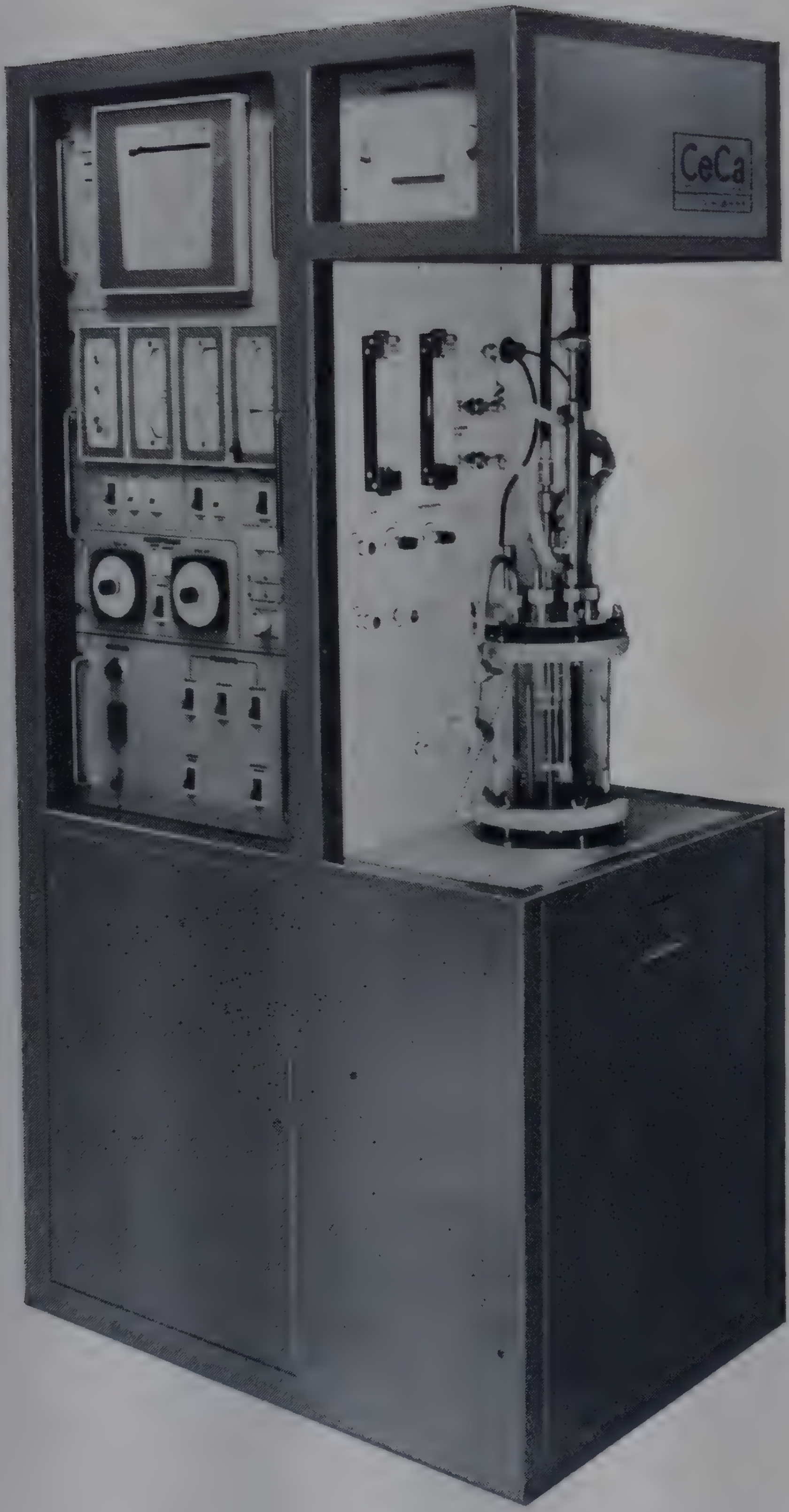
Gallenkamp manufacture a large selection of incubators suitable for a wide range of culture techniques. For full specifications and prices see entries in List No. sequence.

IH-100	Anhydric fan convection incubators. Model with time switch for cyclic operation also available.
IH-150	Economy gravity convection incubators.
IH-275	Cooled incubator, range 0° to 45°C. Model with time switch for cyclic operation also available.
IH-285	Cooled incubator with interior fluorescent illumination. Model with time switch for cyclic operation also available.
IH-295	Air/CO_2 incubator.
IH-350 **IH-370**	Shaking reaction incubators.
IH-460	Orbital incubator.
IH-465	Orbital incubator with refrigeration.
IH-490	Orbital incubator with interior fluorescent illumination, refrigeration and time switch for cyclic operation.

For the growth and study of

Gallenkamp
REGD. TRADE MARK

CONTROLLED ENVIRONMENT



CX-650

APPLICATIONS

- Mass culture of bacteria, fungi, algae, protozoa, viruses and cultured plant and animal cells
- Studies on production of vaccines, antibiotics, enzymes and other microbial and cell products
- Teaching the techniques of fermentation and microbe cultivation
- Studies of brewery and dairy fermentations
- Small scale industrial production of microbes
- Studies of microbiological treatment of effluent and sewage

micro-organisms . . . .

CeCa

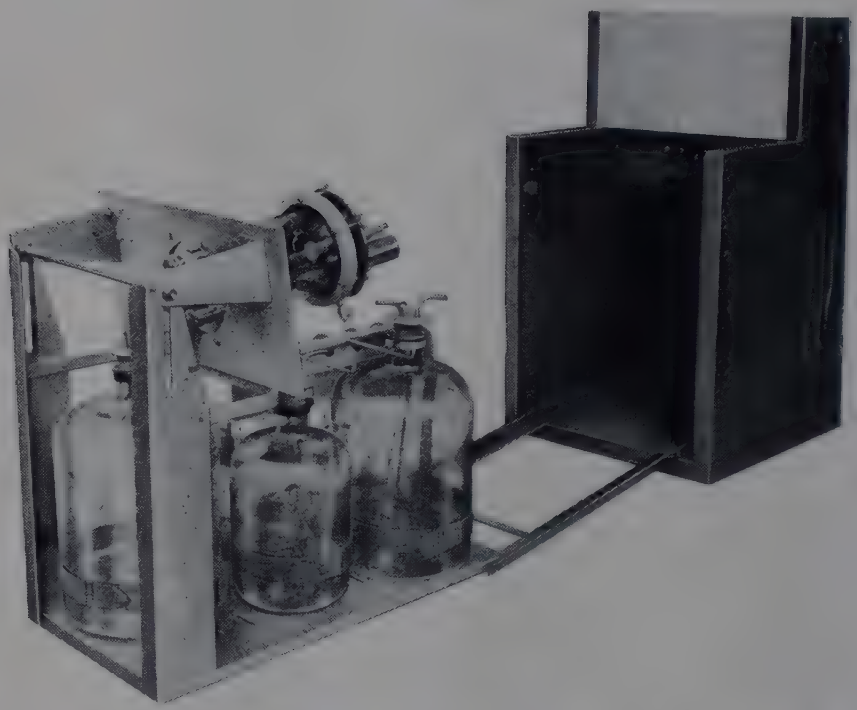
REGD. TRADE MARK

Designed in consultation with Professor S. J. Pirt, Department of Microbiology, Queen Elizabeth College, University of London.

CULTURE APPARATUS

DESIGN FEATURES

- **Accurate auto control and strip chart record of dissolved oxygen, temperature and pH**
- **Accurately controlled adjustable speed high power stirrer**
- **Pumped weir eliminates accretion of filamentous growths**
- **Integral trolley withdraws for autoclaving complete system *in toto***
- **Borosilicate glass 5·5 litre culture vessel with stainless steel fittings**
- **All components readily accessible**



Trolley CX-674 shown withdrawn from the console to facilitate access and sterilisation in an autoclave as a complete unit

Gallenkamp **CeCa,** by providing close control over chemical and physical conditions, creates a stable environment for the long term growth of micro-organisms.

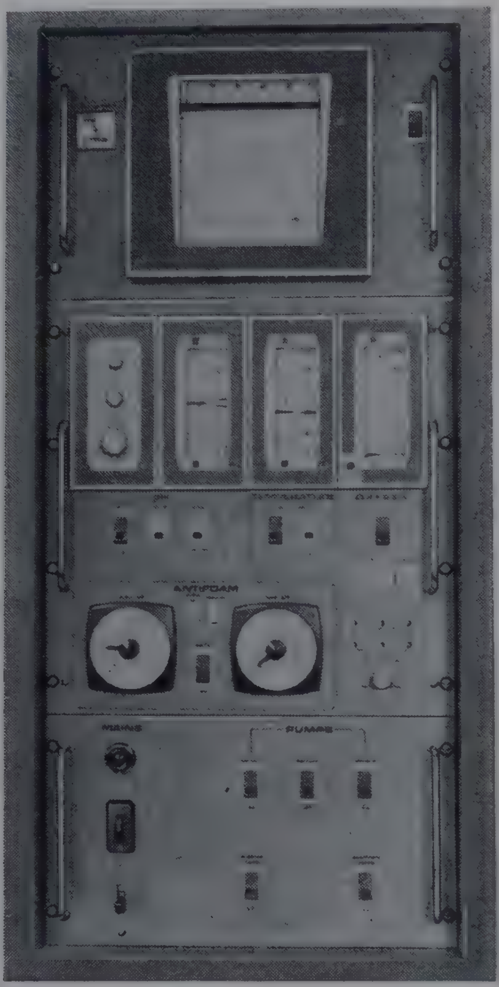
The complete system comprising culture vessel, nutrient, harvest and reagent bottles and associated tubing is constructed on an integral trolley which withdraws down a built-in ramp for easy autoclaving ***in toto*** or as individual components.

continued overleaf

Gallenkamp
REGD. TRADE MARK

CONTROL SYSTEMS

CeCa provides fully automatic control of dissolved oxygen, pH and temperature within the culture. Each parameter is detected by a sensor in the culture and its value displayed on an adjustable indicating potentiometric controller. Signals from the controllers are monitored on the six channel recorder.



Control Panel

Oxygen

The dissolved oxygen tension is measured by a Mackereth pattern oxygen electrode and controlled by an indicating three term proportional controller. To maintain the selected oxygen level, filtered air is introduced into the culture vessel by an air pump at a rate which is regulated by the controller. The powerful stirrer ensures efficient vortex aeration of the culture by constantly changing the liquid surface in contact with the oxygen bearing atmosphere. A valve system provides for adjustment of the maximum rate of air supply and a flowmeter displays the air input flow rate to the culture vessel. As an alternative to automatic control, manual control of air-flow is provided. For this, the auxiliary air pump feeds air to a pressure regulator and the required flow rate is set by means of an adjustable flow regulator and flowmeter.

For purging the culture vessel of carbon dioxide or for working at low oxygen tensions a nitrogen nozzle, flow regulator and flowmeter are fitted. This system may alternatively be used for maintaining an input of carbon dioxide, oxygen or other gases.

pH

An autoclaveable combined glass and reference electrode together with a 'blind' pH meter and an indicating controller measure the culture pH. If selected upper and lower pH limits are exceeded, acid or base is pumped in to restore the value required.

Temperature

Culture temperature is measured by means of a stainless steel sheathed platinum resistance thermometer and indicating temperature controller. When the temperature falls below the selected value, power is supplied to the immersed stainless steel sheathed heater. When operating near ambient temperature the cooling coil, which is built into the culture vessel, can be fed with cooling water through the solenoid valve which operates alternately with the heater.

Product outlet

An adjustable weir regulates the volume contained in the culture vessel. Gravity overflow may be used for most cultures but, for filamentous growths which tend to block the weir tube by accretion, a peristaltic outlet pump is built in. Any air which is taken from the culture vessel by this pump is returned to it through a tube. The harvest vessel is normally mounted on the trolley, but the weir pump provides a convenient means of transferring the harvest to a nearby refrigerated vessel if required.

Nutrients

Provision is made for the simultaneous addition of two nutrients to the culture. Both are pumped by adjustable speed peristaltic pumps from reservoir bottles mounted on the trolley. These vessels may all be recharged by aseptic transfer from stock bottles, using the built in auxiliary air pump and filling port connections. The rate of addition of the nutrients can be measured at intervals by using a stopwatch in conjunction with built-in burette tubes. *CeCa* nutrient addition systems have been designed to discourage the 'growback' of micro-organisms in the nutrient feed lines.

The standard apparatus is supplied with equipment for only one nutrient but a second nutrient system is available as an accessory kit which fits into the *CeCa* console. This enables the operator to change the nutrient or to use 'divided nutrient' techniques.

Stirrer

The culture is stirred by means of a centrifugal impeller of the Porton type. It is driven by a quiet induction motor through a sheathed flexible coupling. Its shaft runs in ball races with a double sealed, lubricant packed gland. Stirring rate is continuously variable and accurately controlled without loss of power at low speeds by means of a tacho-generator and solid state controller.

Antifoam

Antifoam is added to the culture by means of a peristaltic pump. Control of addition rate is by adjustable timers which regulate the duration of each addition and the interval between them.

Elapsed time indicator

A digital indicator registers the time of each run and the total running time of the apparatus.

Outlet gases

Outlet air or other gases are fed through a condenser to prevent water loss by evaporation and thence to an outlet filter which can be connected to gas monitors if required.

CeCa (continued)

REGD. TRADE MARK

MAIN CONSOLE

The culture vessel, all the controls and the operational systems are mounted in one compact console.
The culture vessel, nutrient bottles, reagent bottles, associated tubings and apparatus are mounted on a single trolley which can be withdrawn from the front of the console; to facilitate this operation a fold-away ramp is built-in. **The loaded trolley is of suitable size** (see Technical Data) **to be autoclave sterilised as a complete sealed system** (excluding the oxygen electrode which has to be chemically sterilised and introduced aseptically later using sterilisation assembly CX-688 supplied with a sterilising gas). As the net weight of the equipped trolley without reagents is approximaterly 53 kg special provisions may have to be made for loading it into the autoclave. The autoclave cycle must include air removal with steam flush, steam sterilising at 1·05 kgf/cm² for 2 hours, steam shut-off and self-cooling followed by air admission through bacteriological filters. For users not equipped with a large autoclave, the system can be divided at convenient points for sterilisation in smaller groups. This method however may increase the risk of contamination during final assembly. The pumps for nutrient, product outlet, acid, base and antifoam are all of the peristaltic type and they are mounted in readily accessible positions so that their tubes can easily be fitted after sterilisation. Two air pumps are fitted, one for automatic control of dissolved oxygen tension, the other for manual control of air supply to the culture and as a pressure source for the sampling and transference of nutrients and harvest. Air pressure and flow-rate controls and meters are mounted on the panel behind the culture vessel.
On the left side of the console are mounted three instrument rack drawers which carry all the electrical and electronic controls. Each rack may be pulled forward for maintenance purposes and they can all be reached through a door on the opposite side of the console. Fluorescent lamps are mounted within the console and brightly illuminate the interior.
Nozzles are fitted at the rear of the console for connection of nitrogen and cooling water supplies to the culture vessel.

MISCELLANEOUS DETAILS

Components used to reduce the risk of contamination of the culture and to improve the ease and convenience of aseptic operations such as sampling and nutrient transfer include:—

Sampling and filling port connectors

Adapters which fit 8 mm bore tube and which may be either closed with a universal container (CX-220) or screwed to couplers for fluid transfer and inoculation.

Tubing connectors

A set is supplied so that *CeCa* can be conveniently divided into groups of components for individual autoclaving.

Tubing clamps. Positive and quick acting clamps intended for control of fluid flow lines when sampling the culture, charging nutrient or reagent bottles or discharging the harvest vessel. Can be operated with one hand and give positive shut-off on release.

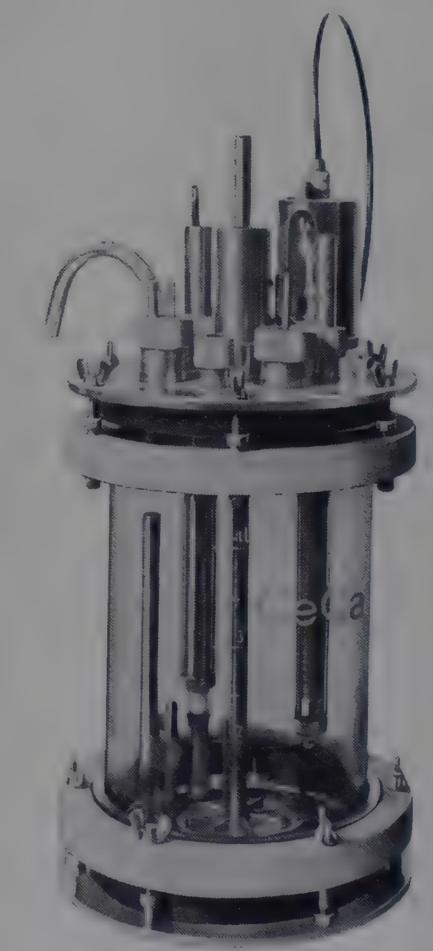
Stopper retainers. Retainers for reservoir bottle stoppers. Quickly removed or replaced. Secure stoppers and prevent 'blow-outs' when recharging under pressure or transferring liquids within the apparatus.

Air filters. Filters fitted to all air inlets and outlets to preserve sterility within the culture system. These filters cause very little back-pressure. Each filter is tested to BS 3928 and has a sodium chloride penetration of less than 0·001% at an air flow rate of 10 litres/min.

Air outlet condenser. A water cooled condenser which is fitted between the culture vessel air outlet and its protective microbiological filter, prevents the outlet filter being saturated by condensate from the humid atmosphere within the culture vessel and reduces water loss by evaporation to a minimum.

CULTURE VESSEL

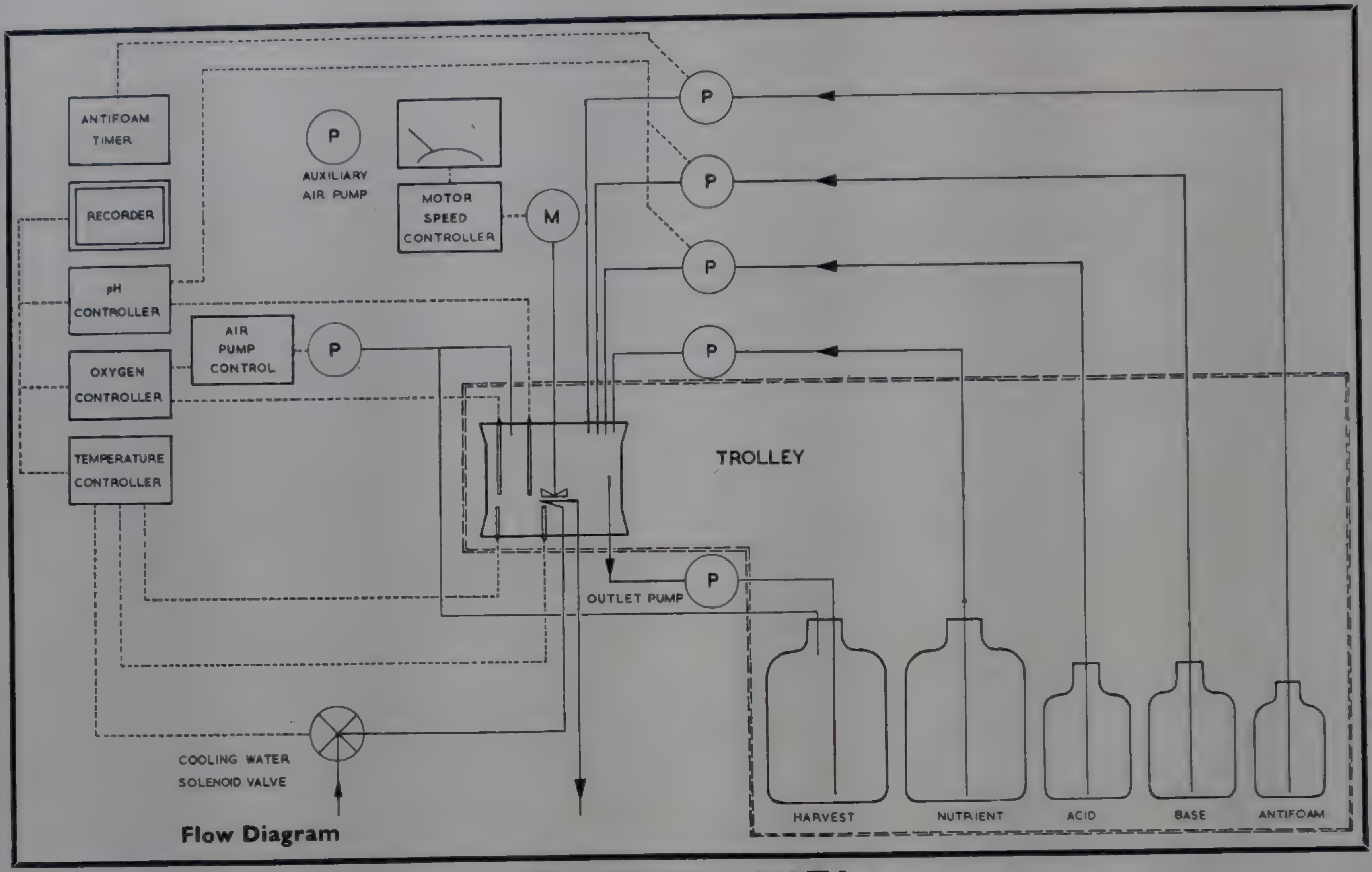
The vessel comprises a borosilicate glass cylinder which is closed at each end by a BS 971 En 58 stainless steel plate and sealed by means of a moulded nitrile rubber gasket. Eight ports are welded in the upper plate and six in the lower plate. Liquid and gas access tubes enter through these ports and are sealed by means of silicone rubber stoppers which are retained securely by screwed collars. The cooling water coil is permanently welded to the lower plate.



Culture Vessel

Tubing Clamp

Gallenkamp
REGD. TRADE MARK


ANTIFOAM TIMER
RECORDER
pH CONTROLLER
OXYGEN CONTROLLER
TEMPERATURE CONTROLLER
AIR PUMP CONTROL
P
AUXILIARY AIR PUMP
MOTOR SPEED CONTROLLER
M
TROLLEY
OUTLET PUMP
COOLING WATER SOLENOID VALVE
HARVEST
NUTRIENT
ACID
BASE
ANTIFOAM

Flow Diagram

TECHNICAL DATA

GENERAL

Stand	
Overall dimensions	196×66×96 cm
Weight, operating	370 kg approx.
Trolley	
Dimensions (culture vessel hinged down)	83×57×107 cm
Weight, for sterilising	53 kg approx.
Culture vessel	
Capacity, net	5·5 litres
Working range, aerobic	1·5 to 3 litres
anaerobic	1·5 to 4 litres
Ports: Upper plate	4×25·4 mm
and	4×12·7 mm (1 spare)
Lower plate	6×25·4 mm (1 spare)

CONTROL SYSTEMS

Oxygen	
Ranges	0—10 mm Hg tension 0—100 mm Hg tension 0—200 mm Hg tension
Fluctuation	less than 2% of full scale.
Air supply, automatic	
Flow rate up to	1 litre/min
Air supply, manual	
Flow rate range	0·05 to 5 litres/min
Auxiliary air supply	
Flow rate, max.	30 litres/min
Pressure, max.	0·2 kgf/cm^2
pH	
Range	2 to 12 pH
Fluctuation, max.	0·1 pH
Acid	
Reservoir capacity	2 litres
Pump rate	25 ml/hr
Base	
Reservoir capacity	2 litres
Pump rate	25 ml/hr

Temperature	
Range	5degC below ambient to 50° C
Fluctuation, max	0·3degC
Recorder	
Scale length	150 mm
Chart speed	12·7 mm/hr
Chart life	2 months
Channels	6 (3 spare)
Input sensitivity	10mV dc for f.s.d.
Printing interval	5 sec/point
Stirrer	
Speed range	300 to 1500 rev/min
Nitrogen	
Supply pressure, max.	2 kgf/cm^2
Flow rate, max.	250 ml/min

FLUID FLOW SYSTEMS

Nutrient 1	
Reservoir capacity	20 litres
Supply rate range	2 ml to 5 litres/hr
Nutrient 2 (optional)	
Reservoir capacity	10 litres
Supply rate range	2 ml to 5 litres/hr
Antifoam	
Reservoir capacity	1 litre
Pump rate	25 ml/hr
Pump timer range	2 to 120 secs
Interval timer range	3 to 180 mins
Product outlet	
Receiver capacity	20 litres
Pump flow rate	9 litres/hr

SUPPLY SERVICES

Mains electricity	
Supply	220/240V 50 Hz single phase 110/120V 60 Hz single phase
Power consumption, max.	750W
Cooling water	
Supply pressure, max.	3 kgf/cm^2
Flow rate, max.	3 litres/min

CeCa (continued)

REGD. TRADE MARK

CX-650

CULTURE APPARATUS, CeCa, *Gallenkamp*, as specification, for continuous and batch culture of micro-organisms. The 5·5 litre culture vessel with electrodes, stirrer and heater is mounted with all associated bottles, tubes and filters on an anodised aluminium trolley which withdraws from the console. Pumps are fitted for addition of nutrient, acid, base, air and antifoam and for product take-off and liquid transference. Indicating controllers reading out on a 6-channel strip chart recorder are provided for pH, temperature and dissolved oxygen, with another indicating controller for stirrer speed. Includes nutrient, air and nitrogen flow rate indicators, antifoam timers and elapsed time indicator. With illustrated instructions manual.

For 220/240V 50 Hz single phase supplies. Each **£5250·00** *gxN*
For 110/120V 60 Hz single phase supplies. Each **£5250·00** *gxN*

REPLACEMENT PARTS

CX-672 **Stand-by spares kit** comprising the following:

For culture vessel —one set gaskets and seals.
For pH system —one electrode and one relay.
For oxygen system —one electrode with maintenance kit and set of pump valves and diaphragms.
For temperature system —one relay and set of sealing rings.

Plus six rolls of recorder chart paper, one set of ribbons, set of stirrer gland seals, one interior lighting starter and assorted tubes, tubing, nipples, stoppers, filters, lamps, fuses, nuts, bolts and washers ... ... Kit **£246·00** *gx*

CX-674 **Trolley,** complete with culture vessel, pH and oxygen electrodes, air filters, set of reservoir bottles complete with fittings, nutrient metering tubes, tubing and sampling points ... ... Each **£1105·00** *gx*

CX-678 **pH electrode,** complete with lead and plug. Each **£19·55** *fx*

CX-682 **Oxygen electrode,** complete with lead and plug. Each **£46·70** *mx*

CX-686 **Maintenance kit,** for oxygen electrode, complete with chemicals ... ... Kit **£16·00** *mx*

CX-688 **Oxygen electrode sterilization assembly** comprising glass tube with stopper and gas filter at either end. Each **£17·00** *gx*

CX-690 **Culture vessel,** borosilicate glass. Glass part only. Each **£24·50** *gx*

CX-698 **Reservoir bottles,** bottles only.

Cap.	0·25	1	2	10	20 litres	
For	sub-reservoir	anti-foam	acid and base	nutrient 2	nutrient 1 and product	
Each	**£0·75**	**0·85**	**1·10**	**4·30**	**7·35**	*ax*

CX-707 **Bottle filling tubes,** glass, for reagent bottle stoppers in order to replenish acid and base. Comprises plain tube with R3/28 threaded top to accept standard cap sealing stopper ... ... Pack of 2 **£1·55** *ax*

CX-709 **Shrouded connectors,** glass, for use with filling tube CX-707. For 8 mm bore flexible tubing. Not threaded. Pack of 2 **£1·95** *ax*

CX-712 **Sampling and filling port connector, female,** stainless steel. For 8 mm bore flexible tubing and with R3/28 female thread for CX-220 universal containers and CX-716 male connectors ... ... Each **£4·60** *gx*

CX-716 **Sampling and filling port connector, male,** glass, with R3/28 male thread for use with CX-712 female connectors. For 8 mm flexible tubing. Required when transferring large volumes of liquids ... ... Each **£0·95** *ax*

CX-220 **Bottle,** universal containers.
For details and prices see entry in List No. sequence.

CX-722 **Tubes,** silicone rubber, for acid, base and antifoam pumps. Pack of 10 **£0·80** *gx*

CX-726 **Tubes,** silicone rubber, for nutrient peristaltic pumps. In packs of 5.

Bore	0·6	1	1·5	2 mm	
Pack	**£0·60**	**0·75**	**0·95**	**1·05**	*gx*
Bore	3	4	6	8 mm	
Pack	**£1·25**	**1·60**	**1·85**	**2·10**	*gx*

CX-728 **Tubes,** silicone rubber, for product outlet peristaltic pump, 8 mm bore ... ... Pack of 5 **£2·90** *gx*

TX-805 **Tubing,** silicone rubber, bores 2, 3, 6 and 8 mm. For general purpose flexible plumbing. For details and prices see entry in List No. sequence.

CX-732 **Tubing clamp.** A simple, lightweight counter-lever clamp with spring jaws, for use on flexible tubing from 0·5 to 10 mm bore. Easily manipulated with one hand to give from drop-by-drop to steady continuous flow of liquid. The clamp shuts off when the handles are released. When used with ordinary thin wall laboratory flexible tubing the clamp will hold back water at pressures up to 1 kgf/cm^2. Handy for many general purpose laboratory applications and recommended for flow control of liquids in continuous culture apparatus ... Each **£5·90** *gx*

CX-734 **Bacteriological air filter.** Sodium chloride penetration less than 0·001% at air flow rate of 10 litres/min. Length 7·6 cm, max. dia. 6·5 cm, with inlet and outlet tubes for 8 mm bore flexible tubing. Can be autoclaved. Each **£2·55** *mx*

CX-738 **Recorder chart paper** ... ... Roll **£1·45** *mx*

CX-740 **Recorder ribbons.** Pack containing 2 of each colour red, blue and green ... ... Pack **£2·15** *mx*

ACCESSORIES

CX-770 **Maintenance kit,** for CeCa, comprising set of screwdrivers, adjustable and pin spanners, AF, BA and BSW spanners, scissors, lubricating oil, silicone grease for stirrer gland and set of pH buffer powders. Kit **£67·00** *gx*

CX-774 **Second nutrient kit,** comprising 10 litre reservoir with stopper and tubes, pump, tubing, etc. for installation by user ... ... Kit **£276·00** *gx*

CX-780 **Antifoam,** polypropylene glycol 2000. 250 ml. Each **£0·45** *gx*

CX-786 **Charging bottle assembly** for refilling nutrient storage bottle with aseptic nutrient. Comprises 20 litre bottle fitted with stopper and clamp, inlet air filter, sampling point and glass connector for linking to storage bottle. Each **£30·50** *gx*

CX-790 **Instructions manual,** supplied in two volumes. Additional copy ... ... Each **£3·00** *gz*

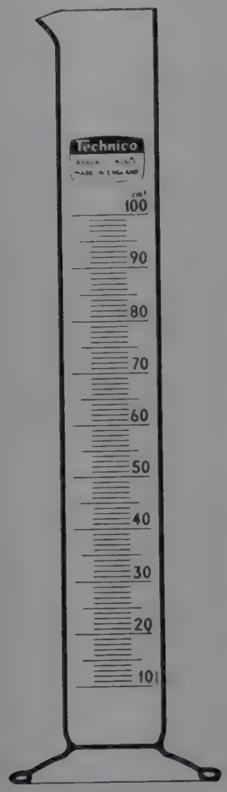
AUTOCLAVE FOR TROLLEY

We will be pleased to advise on a suitable autoclave to accept the complete trolley.

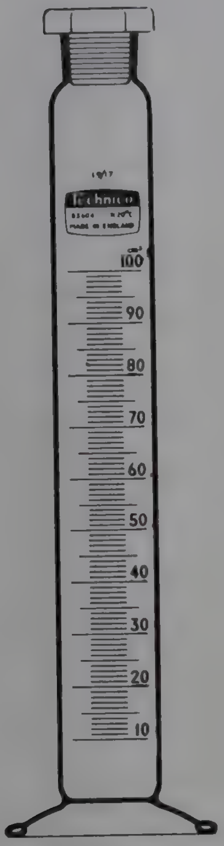
Technico GRADUATED CYLINDERS

REGD. TRADE MARK

With permanent graduations and inscriptions in amber stain.



CY-104



CY-244

Technico graduated glass cylinders are manufactured in our own factory to comply with the requirements of BS 604. The volumetric tolerances are as shown below.

Extract from BS 604

To contain	cm^3	5	10	25	50	100
Subdivided in	cm^3	0·1	0·2	0·5	1	1
Tolerance	$\pm$cm^3	0·1	0·15	0·25	0·5	0·8
To contain	cm^3	250	500	1000	2000	—
Subdivided in	cm^3	2	5	10	20	—
Tolerance	$\pm$cm^3	1·5	2·0	4·0	8·0	—

Technico stoppered cylinders up to 500 cm^3 have interchangeable socket necks to BS 572 fitted with polypropylene hexagonal head stoppers. These stoppers are inert to almost all reagents and provide protection against the rim of the cylinder becoming chipped. If on occasions, for special purposes, glass stoppers are essential then stoppers SU-520 are suitable.

Cylinders of 1000 and 2000 cm^3 have well ground, individually fitted glass stoppers.

WORKS CERTIFICATE

The works certificate of examination, supplied with cylinders CY-105 and CY-245, states the volume of distilled water at 20°C contained between zero and each of five points on the graduated scale.

CYLINDERS with spout

List No.	Capacity Subdivided	cm^3 cm^3	5 0·1	10 0·2	25 0·5	50 1·0	100 1·0	250 2·0	500 5·0	1000 10·0	2000 20·0	
CY-104	*Technico*	Ten	£ **3·30**	£ **3·40**	£ **3·80**	£ **4·30**	£ **5·00**	£ **7·00**	£ **11·40**	£ **14·40**	£ **26·00**	ax
		Each	**0·39**	**0·40**	**0·44**	**0·48**	**0·55**	**0·78**	**1·30**	**1·60**	**2·90**	
CY-105	*Technico* with Works Certificate	Each	**1·45**	**1·55**	**1·65**	**1·70**	**1·80**	**2·45**	**2·85**	**3·60**	**5·25**	ax

CYLINDERS with stopper

List No.	Capacity Subdivided Stopper size	cm^3 cm^3	5 0·1 10/13	10 0·2 10/13	25 0·5 14/15	50 1·0 14/15	100 1·0 19/17	250 2·0 24/20	500 5·0 24/20	1000 10·0 —	2000 20·0 —	
CY-244	*Technico*	Ten	£ **4·60**	£ **4·70**	£ **5·30**	£ **6·60**	£ **7·40**	£ **14·40**	£ **22·50**	£ **26·00**	£ **43·00**	ax
		Each	**0·51**	**0·52**	**0·59**	**0·74**	**0·82**	**1·60**	**2·50**	**2·90**	**4·80**	
CY-245	*Technico* with Works Certificate	Each	**1·50**	**1·65**	**1·75**	**1·85**	**1·90**	**3·00**	**4·05**	**5·00**	**6·60**	ax

PYREX
GRADUATED CYLINDERS

CY-254

CYLINDERS, graduated, with spout, *Pyrex* glass, to BS 604, with hexagonal foot.

Capacity	10	25	50	100 cm^3	
Subdivided	0·2	0·5	1·0	1·0 cm^3	
Std. pack qty.	12	12	12	6	
Std. pack	**£10·35**	**11·20**	**11·75**	**6·85**	*jx*
Each	**£ 0·96**	**1·04**	**1·08**	**1·25**	
Capacity	250	500	1000	2000 cm^3	
Subdivided	2·0	5·0	10·0	20·0 cm^3	
Std. pack qty.	6	6	4	4	
Std. pack	**£9·25**	**13·30**	**11·65**	**15·20**	*jx*
Each	**£1·70**	**2·40**	**3·10**	**4·10**	

CY-264

CYLINDERS, graduated, *Pyrex* glass, as CY-254 but with stopper. Capacities 10 cm^3 to 250 cm^3 have a glass stopper. Capacities 500 cm^3 to 2000 cm^3 have a plastics stopper.

Capacity	10	25	50	100 cm^3	
Stopper size	10/13	14/15	14/15	19/17	
Std. pack qty.	12	12	12	12	
Std. pack	**£18·05**	**19·50**	**20·55**	**22·30**	*x*
Each	**£ 1·70**	**1·80**	**1·95**	**2·10**	
Capacity	250	500	1000	2000 cm^3	
Stopper size	24/29	24/29	34/35	34/35	
Std. pack qty.	12	12	6	4	
Std. pack	**£28·30**	**37·40**	**24·45**	**22·05**	*jx*
Each	**£ 2·65**	**3·50**	**4·40**	**5·90**	

CY-270

CYLINDERS, graduated, with spout, *Pyrex* glass, with detachable polythene foot.

Capacity	50	100	250 cm^3	
Subdivided	1·0	1·0	2·0 cm^3	
Std. pack of 12	**£4·90**	**5·85**	**7·90**	*jx*
Each	**£0·46**	**0·54**	**0·74**	

CY-271 **Glass part only** for CY-270.

Capacity	50	100	250 cm	
Std. pack of 12	**£4·20**	**5·10**	**6·80**	*jx*
Each	**£0·41**	**0·48**	**0·64**	

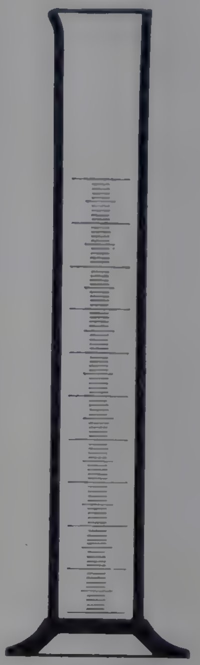
CY-275

CYLINDERS, graduated, *Pyrex* glass, with detachable polythene foot and plastics stopper.

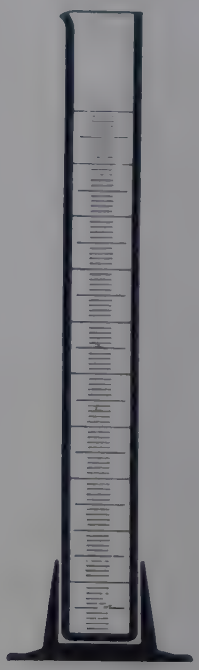
Capacity	50	100	250 cm^3	
Std. pack of 12	**£7·50**	**8·60**	**11·80**	*jx*
Each	**£0·70**	**0·80**	**1·10**	

CY-276 **Glass part only** for CY-275.

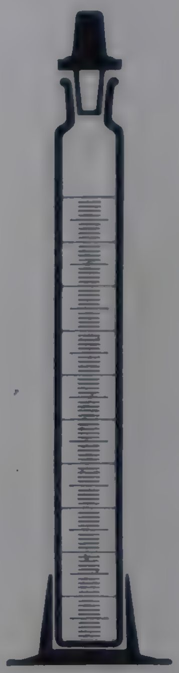
Capacity	50	100	250 cm^3	
Std. pack of 12	**£5·85**	**7·00**	**9·45**	*jx*
Each	**£0·55**	**0·66**	**0·88**	



CY-254
(CY-294 and CY-298 are similar)



CY-270



CY-275

PLASTICS GRADUATED CYLINDERS

***CY-294**

CYLINDERS, polypropylene, with spout and moulded calibrations.

Capacity	10	25	50	100 cm^3	
Subdivided	0·1	0·5	1	1 cm^3	
Ten	**£3·10**	**3·50**	**4·70**	**7·10**	*mx*
Each	**£0·37**	**0·41**	**0·52**	**0·80**	
Capacity	250	500	1000	2000 cm^3	
Subdivided	2	5	10	20 cm^3	
Ten	**£10·20**	**15·50**	**20·40**	**31·70**	*mx*
Each	**£ 1·14**	**1·75**	**2·70**	**3·60**	

***CY-298**

CYLINDERS, transparent TPX, with spout and moulded calibrations.

Capacity	10	25	50	100 cm^3	
Subdivided	0·1	0·5	1	1 cm^3	
Ten	**£3·50**	**4·20**	**7·00**	**10·00**	*mx*
Each	**£0·41**	**0·47**	**0·78**	**1·12**	
Capacity	250	500	1000	2000 cm^3	
Subdivided	2	5	10	20 cm^3	
Ten	**£17·00**	**27·50**	**34·00**	**53·00**	*mx*
Each	**£ 1·90**	**3·10**	**3·80**	**6·00**	

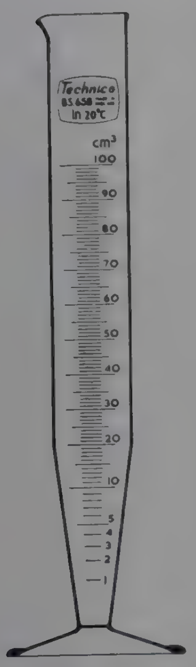
For general properties of plastics materials see data on page headed Plastics.

Technico DISTILLATION RECEIVERS

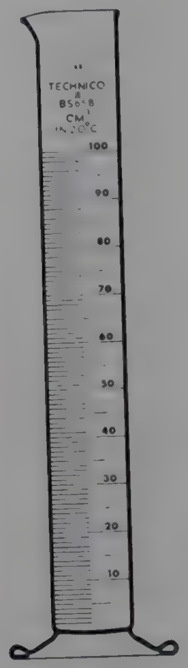
REGD. TRADE MARK

to BS 658 'Apparatus for the Determination of Distillation range'

With permanent graduations and inscriptions in amber stain.


Technico
BS 658
In 20°C
cm³
100
90
80
70
60
50
40
30
20
10
5
4
3
2
1

CY-304


TECHNICO
BS 658
CM³
IN 20°C
100
90
80
70
60
50
40
30
20
10

CY-316

CY-304

DISTILLATION RECEIVER, glass, *Technico* Class B, **Crow** pattern to BS 658 type 1. Capacity 100 cm³.

Ten **£17·00** Each **£1·90** *ax*

CY-314

DISTILLATION RECEIVERS, glass, *Technico* Class B, **cylindrical** pattern to BS 658 type 2.

Capacity	100	200 cm³	
Ten	**£12·00**	**17·00**	*ax*
Each	**£ 1·35**	**1·90**	

CY-316

DISTILLATION RECEIVERS, glass, *Technico* Class A, **cylindrical** pattern to BS 658 type 2.

Capacity	100	200 cm³	
Ten	**£29·00**	**37·00**	*ax*
Each	**£ 3·20**	**4·10**	

OTHER APPARATUS TO BS 658

Distillation flasks	see FJ-300.
Condensers, Type 1, Liebig	see PE-792.
Type 2, air	see PE-795.
Type 3, straight	see PE-790.
Shields, gas heated	see PE-783.
electrically heated	see PE-786.
Thermometers, partial immersion	see TJ-154, TJ-174, TJ-208, TJ-230.

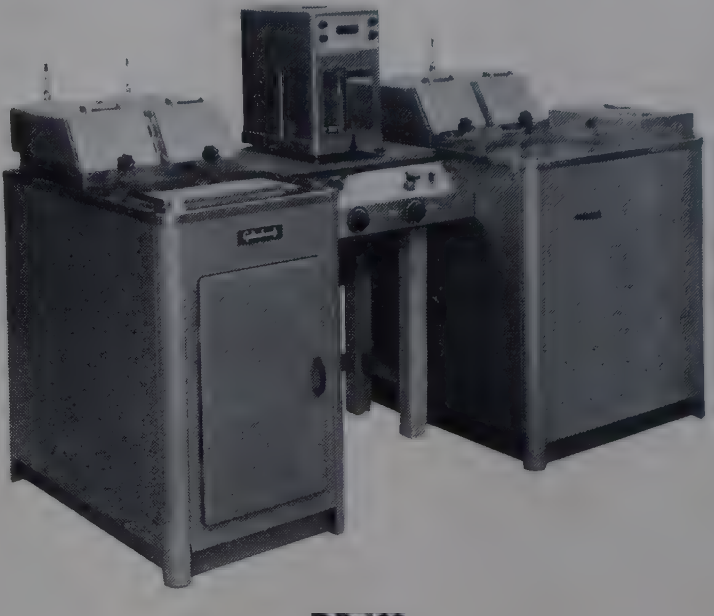
For full details and prices see entries in List No. sequence.

Technico DAIRY PRODUCTS TEST UNIT

REGD. TRADE MARK

For rapid and accurate routine determinations of fats, total solids and moisture in dairy and allied food products.

- **Permits simultaneous determination of fats and total solids by one operator**
- **Fats determination using hotplates and 8-place centrifuge**
- **Total solids determination using thermostatically controlled vacuum ovens**
- **Sub-assemblies include control panel, balance table, coolant tank, reagent dispensary and storage cupboard**



DB-100

DB-100
DAIRY PRODUCTS TEST UNIT, *Technico.* Details and quotation on application. When enquiring please state voltage and frequency of electricity supply.

BACTERIOLOGICAL TESTS

METHYLENE BLUE REDUCTION TEST

for pasteurised milk.

DB-200
FLASK, *E-MIL,* 800 cm³, unstoppered, for the preparation of methylene blue solution.
Std. pack of 3 **£3·24** Each **£1·14** *jx*

DB-210
PIPETTE, blow-out, one mark, 1 cm³.
72 **£8·65** Ten **£1·35** Each **£0·20** *fx*

DB-220
TEST TUBE, rimless, 150×16 mm dia., with ring graduation at 10 cm³ and sandblast badge for pencil notations. 72 **£1·78** Ten **£0·31** Each **£0·13** *fx*

SU-760	**Stopper,** No. 13, for tubes DB-220 ...	For details and prices see entries in List No. sequence.
SR-800	**Sterilising box,** for pipettes... ...	
WF-360	**Water bath, thermostatic**	
WF-389	**Rack,** to hold test tubes	

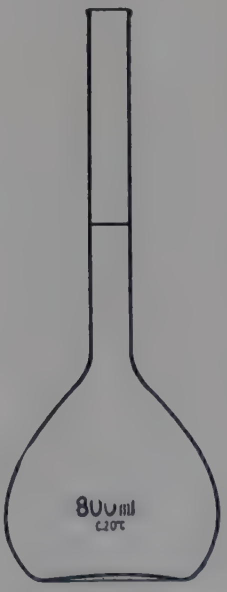
PHOSPHATASE TEST

for pasteurised milk.

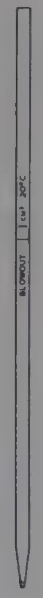
DB-230
PIPETTE, *Technico,* **blow-out,** two mark, 0·5 and 1·0 cm³ ... ... Ten **£1·80** Each **£0·25** *ax*

DB-210	**Pipette, blow-out,** 1 cm³	For details and prices see entries in List No. sequence.
DB-220	**Test tube,** 150×16 mm	
WF-360	**Water bath, thermostatic**	
WF-389	**Rack,** to hold test tubes	

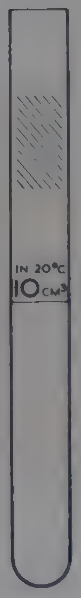
Lovibond comparators with colour grading disks for Kay and Graham and for Aschaffenburg and Mullen phosphatase tests, detailed quotation on application.



DB-200



DB-210



DB-220

COLIFORM TEST

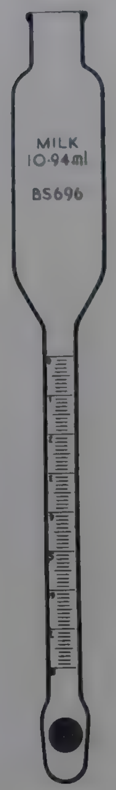
for detecting bacteria of the coli-aerogenes group.

PM-344	**Pipettes, graduated,** *Technico* ...	For details and prices see entries in List No. sequence.
TF-122	**Durham tube,** 35×8 mm dia. ...	
TF-128	**Test tubes,** 150×16 and 150×19 mm.	
WF-360	**Water bath, thermostatic**	
WF-387	**Racks, to hold test tubes**	

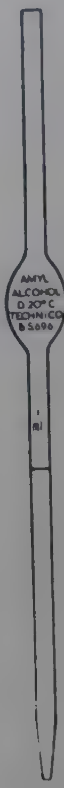
PLATE COUNT

for estimating numbers of bacteria in milk.

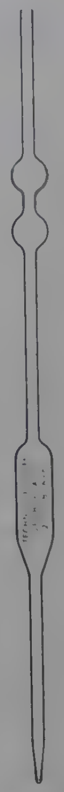
DB-210	**Pipette, blow out,** 1 cm³	For details and prices see entries in List No. sequence.
CX-240 et seq.	**Petri dishes**	
CX-300	**Colony counter,** *Gallenkamp* ...	
IH-100	**Incubator,** *Gallenkamp,* **electrically heated**	
SR-820	**Sterilising box, for Petri dishes** ...	



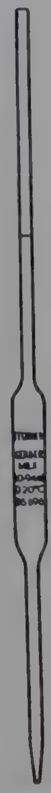
DC-032



DC-200



DC-210



DC-220

FATS by GERBER METHOD to BS 696.

BUTYROMETER TUBES
with plain neck.

List No.	Application	Capacity	Range	Ten	Each	
				£	£	
DC-030	Skim milk	10·94 cm³	4% in 0·1	10·20	1·14	*cx*
DC-032	Milk	10·94 cm³	8% in 0·1	10·00	1·12	*jx*
DC-036	Cheese	3 g	40% in 1·0	11·00	1·25	*cx*
DC-038	Cream	5 g	70% in 1·0	11·00	1·25	*cx*

ACCESSORIES

DC-130	**Lock stoppers.** In pack of 10.	10 packs	£12·80	Pack	£1·45	*cx*
DC-132	**Lock stopper key** ...	...	...	Each	£0·55	*cx*
DC-150	**Cleaning brush** ...	Ten	£1·00	Each	£0·17	*cx*

WATER BATH

WF-455

WATER BATH, *Gallenkamp*, **stainless steel interior.** With *Compenstat* (solid state) control to 100°C. Internal depth 20 cm.

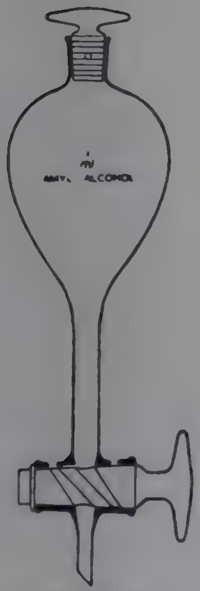
WF-385

WATER BATH RACK, *Gallenkamp*, **stainless steel,** to hold 16×25 mm dia. tubes. Six racks can be accommodated in WF-455.

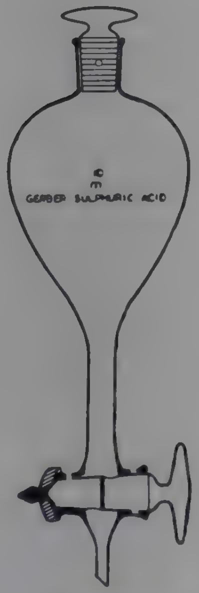
For details and prices see entries in List No. sequence.

PIPETTES, *Technico*

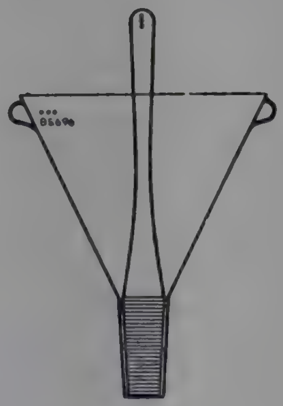
List No.	To deliver	Capacity	Ten	Each	
			£	£	
DC-200	Amyl alcohol	1 cm³	2·30	0·30	*ax*
DC-210	Sulphuric acid	10 cm³	3·30	0·39	*ax*
DC-220	Milk	10·94 cm³	3·70	0·43	*ax*



DC-230



DC-240



DC-260

AUTOMATIC MEASURES

List No.	To deliver	Capacity	Each	
			£	
DC-230	Amyl alcohol	1 cm³	11·20	*cx*
DC-240	Sulphuric acid	10 cm³	13·70	*cx*

PM-714 **Measure, automatic,** for delivering 10 cm³ quantities of sulphuric acid for the Gerber test. For price see entry in List No. sequence.

FUNNEL

DC-260

FUNNEL, glass, Ⓐ, for weighing cream or cheese for the Gerber and Babcock tests. Fitted with standard joint 7/16 and hollow stopper. Ten **£21·00** Each **£2·35** *ax*

DC-270

STAND

DC-270

STAND, clear plastics, for butyrometer tubes, complete with plastics cover protecting operator against acid splash. To take 12 tubes ... ... Each **£10·70** *cx*

GERBER CENTRIFUGE

DC-360

CENTRIFUGE, Gerber, maximum speed approximately 1100 rev/min. With speed regulating rheostat supplied as a separate unit. To take heads DC-368 from 8 to 24 tubes. **With rheostat but without head or speed indicator.** For 230/250V a.c. single phase or d.c. supplies. Each **£42·00** *fxN*

ACCESSORIES

DC-364 **Speed indicator,** bubble type, for DC-360. Each **£4·00** *fx*

DC-368 **Heads,** to fit DC-360.

To take	8	12	16	24 tubes	
Each	**£14·00**	**16·00**	**18·00**	**19·50**	*fxN*

FATS by RÖSE-GOTTLIEB METHOD
to BS 1741

EXTRACTION TUBES
with 19/17 standard joint stopper.

List No.		Ten	Each	
		£	£	
DC-702	**Short siphon tube pattern** (AG)	**14·20**	**1·60**	*ax*
DC-706	**Long siphon tube pattern** (AG)	**16·50**	**1·85**	*ax*

HORTVET THERMOMETERS
for freezing point of milk.

***DC-806**

THERMOMETER, Hortvet, to BS 3095, scale span −2·0°C to +1·0°C in 0·01°C, for partial (175 mm) immersion. Overall length 610 mm, stem diameter 8 to 10 mm ... ... Each **£11·00** *cx*

***DC-808**

THERMOMETER, Hortvet, to BS 3095, scale span −5°C to +5°C in 0·5°C for partial (200 mm) immersion. Overall length about 470 mm, stem diameter 6 to 8 mm. Each **£7·50** *cx*

HYDROMETER (Lactometer)
to BS 734.

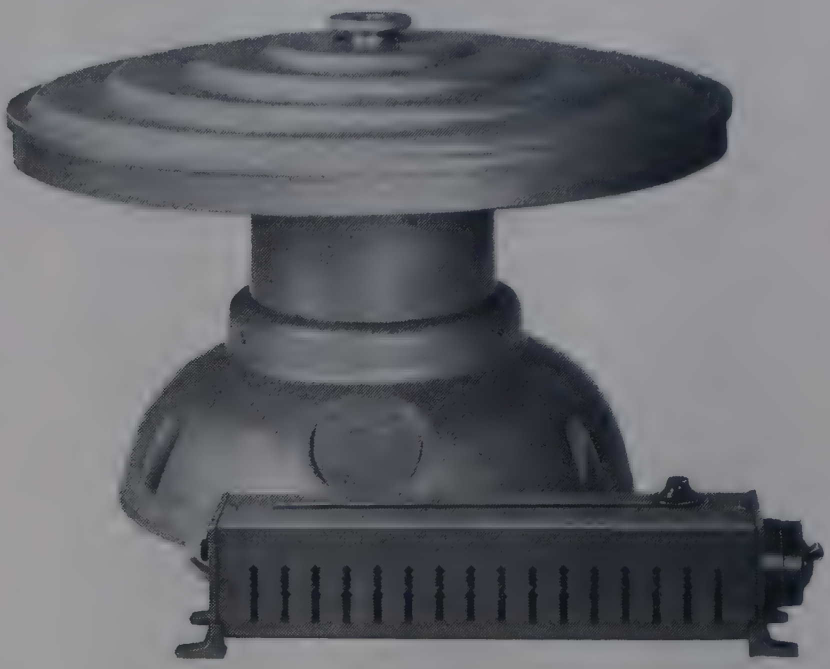
DC-900

DENSITY HYDROMETER, for use in normal milk; range 1·025 to 1·035 g/cm³, subdivided 0·0002 g/cm³. Overall length 245 mm ... ... Each **£1·65** *mx*

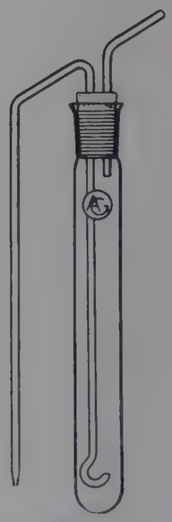
SOLUBILITY INDEX

DE-600

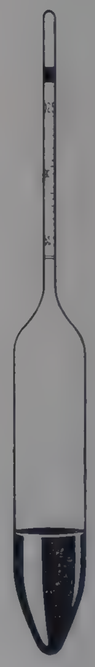
SOLUBILITY INDEX TUBE, *Technico,* 50 cm³, graduated 0·1 cm³ from 0·5 to 1 cm³, 0·2 cm³ from 1 to 3 cm³, and 0·5 cm³ from 3 to 15 cm³. Accepted by Gerber centrifuge DC-360... ... Ten **£32·00** Each **£3·60** *ax*



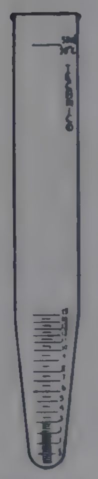
DC-360



DC-706



DC-900



DE-600

MOISTURE IN BUTTER DETERMINATION
to BS 769.

Suitable apparatus may be selected from the following:

BA-810	**Balance,** *Mettler* P160, direct reading.	For details and prices see entries in List No. sequence.
BH-220 to **BH-285**	**Basins**	
OV-160	**Oven, drying,** to BS 2648, electrically heated	
MV-600	**Oven, vacuum, for moisture determinations**	

LABORATORY DEIONISERS

The water delivered by the deionisers listed on the following pages is not necessarily pyrogen free **and is therefore unsuitable for clinical injections.**

> **NOTE: Cartridge regeneration for deionisers DH-630, DH-640, DH-675 and DH-690.**
>
> Cartridges must be returned to the manufacturer for regeneration. Cartridge exchange vouchers are issued for this purpose and are obtainable only from the manufacturer. Therefore to ensure uninterrupted supplies of deionised water the initial purchase of a replacement cartridge pack is recommended.

DH-604

DH-604

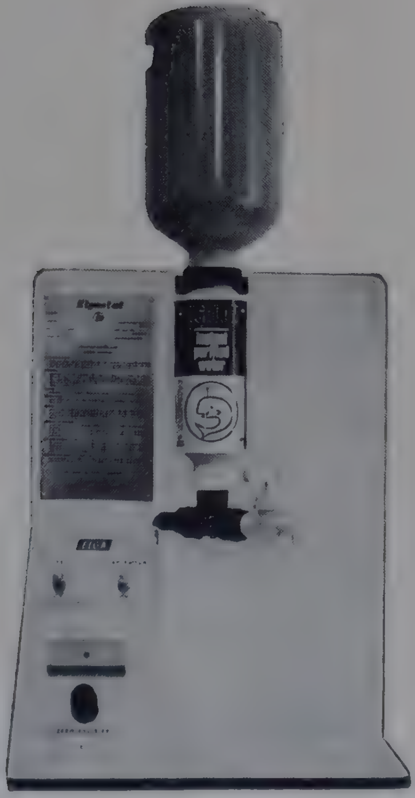
DEIONISER, *Elgastat,* **Model B114.**

Cartridge: Mixed bed, expendable.
Mounting: Wall.
Output: 30 to 300 litres tap water depending on hardness.
Flow rate: 36 litres/hr.
Average effluent quality: 1×10^6 ohm/cm^3.
Effluent purity: 0·1 ppm silica; 0 ppm CO_2.
Effluent pH: 6·5 to 7.
Water purity meter: Battery operated.
Supply pressure: 0·7 kgf/cm^2 min.
Overall dimensions: 16×14×38 cm high.
Weight: 1·6 kg net.
Inlet: Hose with tap fitting provided.
Outlet: For 6·35 mm i.d. flexible tubing.

Supplied with dry cell battery and five *Elgacan* C114 cartridges ... ... Each **£22·00** *fx*

REPLACEMENT PART

DH-606 **Cartridges,** *Elgacan* C114 ... Pack of 4 **£5·00** *fx*



DH-615

DH-615

DEIONISER, *Elgastat,* **Model B102 Mark II.**

Cartridge: Mixed bed, expendable.
Mounting: Bench.
Output: 30 to 200 litres tap water depending on hardness.
Flow rate: 15 litres/hr.
Average effluent quality: 4×10^6 ohm/cm^3.
Effluent purity: 0·1 ppm silica; 0 ppm CO_2.
Effluent pH: 6·5 to 7.
Water purity meter: Battery operated.
Supply pressure: Gravity feed from reservoir tank fitted.
Overall dimensions: 30×20×70 cm high.
Weight: 3·7 kg net
Outlet: Free flow nozzle.

Supplied with dry cell battery and four *Elgacan* C114 cartridges ... ... Each **£50·00** *fx*

REPLACEMENT PART

DH-606 **Cartridges,** *Elgacan* C114. For details and price see entry above.

DH-630

DEIONISER, *Elgastat,* **Model B125,** for U.K. only.

Cartridge:	Mixed bed. (See Note on p. 172 for regeneration).
Mounting:	Bench.
Output:	70 to 900 litres tap water depending on hardness.
Flow rate:	50 litres/hr.
Average effluent quality:	2×10^6 ohm/cm^3.
Effluent purity:	0·1 ppm silica; 0 ppm CO_2.
Effluent pH:	6·5 to 7.
Water purity meter:	Battery operated.
Supply pressure:	0·7 kgf/cm^2 min.
Overall dimensions:	Height 50 cm, base dia. 7·5 cm.
Weight:	2·9 kg net.
Inlet:	Nozzle for 10 mm bore tubing.
Outlet:	Nozzle for free flow.

With dry cell battery and one cartridge C408.
Each **£27·50** *fx*

REPLACEMENT PART
DH-632 **Cartridge,** C408 ... ... Each **£10·00** *fx*

DH-630

DH-633

DEIONISER, *Elgastat,* **Model B125/B,** as DH-630 but export model and battery operated. With dry cell battery and one cartridge C408F ... Each **£27·50** *fx*

REPLACEMENT PART
DH-636 **Ion-exchange resin,** C208 sufficient for 20 charges.
Pack **£38·70** *fx*

DH-640

DEIONISER, *Elgastat,* **Model B113,** for U.K. only.

Cartridge:	Mixed bed. (See Note on p. 172 for regeneration).
Mounting:	Wall.
Output:	160 to 4000 litres tap water depending on hardness.
Flow rate:	90 litres/hr.
Average effluent quality:	2×10^6 ohm/cm^3.
Effluent purity:	0·1 ppm silica; 0 ppm CO_2.
Effluent pH:	6·5 to 7.
Water purity meter:	Mains operated 200/250V a.c.
Supply pressure:	0·7 kgf/cm^2 min.
Overall dimensions:	27×24×51 cm.
Weight:	7·5 kg net.
Inlet and outlet:	Nozzles for 12·5 mm i.d. flexible tubing.

With one cartridge C211 ... ... Each **£45·00** *fx*

REPLACEMENT PART
DH-641 **Cartridge,** C211 ... ... Each **£19·90** *fx*

DH-640

DH-643

DEIONISER, *Elgastat,* **Model B113/B,** as DH-640 but export model and battery operated. With dry cell battery and one cartridge C211F ... Each **£45·00** *fx*

REPLACEMENT PART
DH-636 **Ion-exchange resin,** C208, sufficient for five charges. For price see entry above.

DH-650

DEIONISER, *Raleigh,* **Model I.**

Ion-exchange charge:	Mixed bed, regenerative *in situ*.
Mounting:	Bench.
Output:	70 to 850 litres tap water depending on hardness.
Flow rate:	40 litres/hr max.
Average effluent quality:	5 to 20×10^6 ohm/cm^3.
Effluent purity:	0·05 ppm silica; 0 ppm CO_2.
Effluent pH:	7.
Water purity meter:	Mains operated 100/110 and 200/250V a.c.
Overall dimensions:	100 cm high×9 cm dia.
Weight:	5 kg.
Inlet and outlet	For 10 mm i.d. flexible tubing.

Each **£83·50** *fxN*

REPLACEMENT PART
DH-652 **Ion-exchange resin,** single charge ... Each **£8·00** *fxN*

DH-650

DH-675

DH-690

DH-730

DH-675

DEIONISER, *Permutit,* **Mark 17.**

Cartridge:	Mixed bed. (See Note on p. 172 for regeneration).
Mounting:	Wall or bench.
Output:	110 to 1300 litres tap water depending on hardness.
Flow rate:	Up to 120 litre/hr.
Average effluent quality:	1×10^6 ohm/cm^3.
Effluent purity:	0·05 ppm silica; 0 ppm CO_2.
Effluent pH:	6·5 to 7.
Conductivity meter:	Battery operated.
Supply pressure:	0·5 kgf/cm^2 to 3·5 kgf/cm^2.
Overall dimensions:	$23 \times 24 \times 50$ cm.
Weight:	8 kg net.
Inlet:	Hose and adapter for water tap.
Outlet:	Nozzle for free flow.

Supplied with dry cell battery and one cartridge.
Each **£26·00** *fx*

REPLACEMENT PART

DH-677 Cartridge ... ... Each **£9·00** *fx*

DH-690

DEIONISER, *Permutit,* **Mark 11.**

Cartridge:	Mixed bed. (See Note on p. 172 for regeneration).
Mounting:	Wall or bench.
Output:	200 to 3000 litres tap water depending on hardness.
Flow rate:	120 litres/hr.
Average effluent quality:	1×10^6 ohm/cm^3.
Effluent purity:	0·05 ppm silica; 0 ppm CO_2.
Effluent pH:	6·5 to 7.
Conductivity meter:	Battery operated.
Supply pressure:	0·5 kgf/cm^2 to 3·5 kgf/cm^2.
Overall dimensions:	$28 \times 21 \times 70$ cm.
Weight:	12·7 kg.
Inlet:	Hose and adapter for water tap.
Outlet:	Nozzle for free flow.

Supplied with dry cell battery and one cartridge.
Each **£36·00** *fx*

REPLACEMENT PART

DH-692 Cartridge ... ... Each **£17·00** *fx*

DH-730

DEIONISER, *Permutit,* **Mark 8H.**

Ion-exchange charge:	Twin column, regenerative *in situ*, 'Zeo-Karb' and weakly basic 'De-Acidite'.
Mounting:	Trolley.
Output:	700 to 9000 litres tap water depending on hardness.
Flow rate:	60 litres/hr.
Average effluent quality:	1×10^3 ohm/cm^3.
Effluent purity:	10 ppm silica; CO_2 variable dependent on alkalinity of tap water.
Effluent pH:	4 to 5.
Conductivity meter:	Battery operated.
Supply pressure:	0·5 kgf/cm^2 to 3·5 kgf/cm^2
Overall dimensions:	$150 \times 100 \times 42$ cm.
Weight:	28 kg.
Inlet:	Hose and adapter for water tap.
Outlet:	Nozzle for free flow.

Supplied with dry cell battery and ion-exchange charge.
Each **£109·00** *fx*

DH-735

DEIONISER, *Permutit,* **Mark 8F.** As DH-730 but with strongly basic 'De-Acidite' column.

Output:	210 to 2500 litres tap water depending on hardness.
Effluent purity:	0·2 ppm silica; 0 ppm CO_2.
Effluent pH:	8·5 to 9·5.

Supplied with dry cell battery and ion-exchange charge.
Each **£109·00** *fxN*

DENSITY APPARATUS

DJ-530

DENSITY BOTTLES, *Technico*, with capillary stopper, not adjusted.

DJ-534

DENSITY BOTTLES, *Technico*, in accordance with BS 733, IP 190 type 1 (b) and STPTC Schedule V 11.

DJ-537

DENSITY BOTTLES, *Technico*, as DJ-534, but with works certificate of determined capacity.

Capacity ml	DJ-530		DJ-534		DJ-537		
	Ten	Each	Ten	Each	Ten	Each	
	£	£	£	£	£	£	
10	4·20	0·47	11·00	1·25	21·50	2·40	ax
25	5·80	0·64	12·00	1·35	24·00	2·65	ax
50	6·60	0·74	12·20	1·35	26·50	2·95	ax
100	7·40	0·82	17·00	1·90	34·00	3·80	ax

DJ-550

DENSITY BOTTLES, *Technico*, **Castell-Evans,** with stopper and cup.

Capacity approx.	25	50 ml	
Ten	£20·50	21·50	ax
Each	£ 2·30	2·40	

DJ-560

DENSITY BOTTLE, *Technico*, **Hubbard,** in accordance with STPTC Schedule V 12. Capacity approx. 40 ml.
Each £2·85 ax

DJ-570

DENSITY BOTTLES, *Technico*, **Reischauer,** with 20 mm scale on neck and 10/13 stopper.

Capacity approx.	25	50 ml	
Ten	£15·50	16·00	ax
Each	£ 1·75	1·80	

DJ-600

DENSITY BOTTLE, with thermometer and capped side arm. Capacity 50 ml, adjusted within 5%. Thermometer scaled 15° to 30°C in 0·2degC ... Each £7·15 fx

DJ-650

DENSITY BOTTLE, *Pyrex* glass, **Rees-Hugill,** to BS 2701, for density determinations of powdered and granular materials. Comprises 250 ml flask with zero line, and neck graduated 2·7 to 2·0 g/cm³, for 100 g sample. For other densities in the range 1·0 to 5·4 g/cm³, the sample weight is varied as described in BS 2701.
Each £7·26 jx

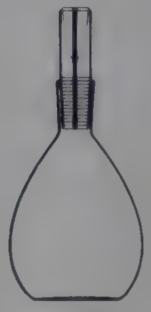
DJ-670

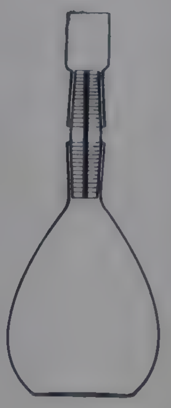
DENSITY BOTTLE, *Technico*, **Armstrong,** for rapid measurements of the volumes of irregular solids. Comprises a wide mouth stoppered bottle with a tubulure for connection to a burette. Water filling the bottle to the stem mark is sucked into the burette after which the sample is added, and the water returned to the original mark. The difference in burette readings is the volume of the sample. **Without burette.**
Ten £20·00 Each £2·25 ax

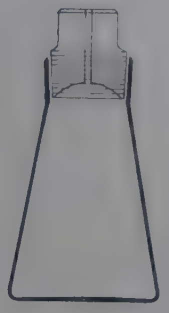
DJ-750

PYKNOMETER TUBES, *Technico*, **Nicol,** for liquids, with one mark.

Capacity	5	10	25 ml	
Ten	£5·20	6·60	7·40	ax
Each	£0·58	0·74	0·82	


DJ-530


DJ-550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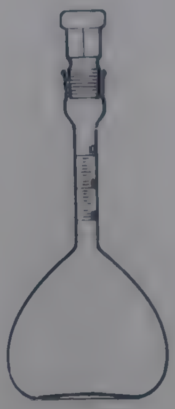
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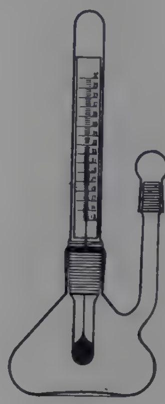
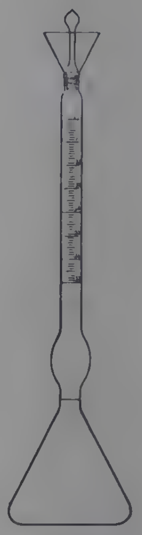
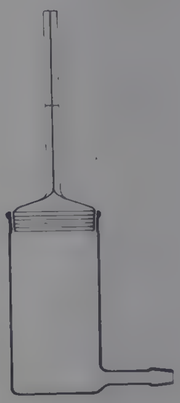
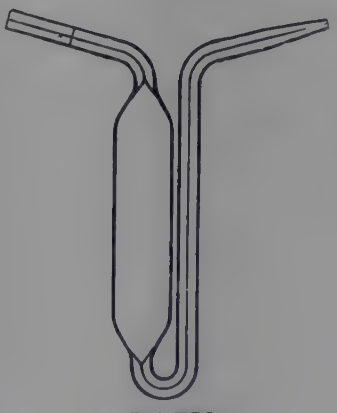
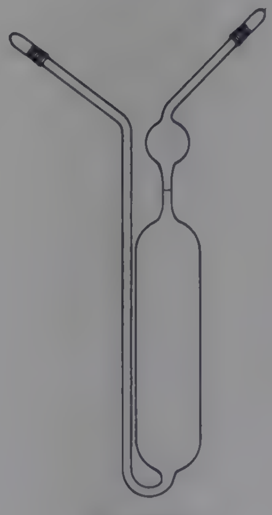
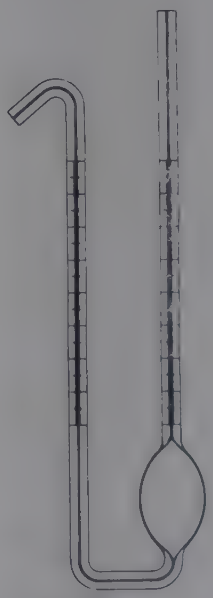

DJ-600


DJ-650


DJ-670


DJ-750


DJ-780


DJ-790

DJ-780

PYKNOMETER TUBE, *Technico*, **Sprengel,** for liquids, with two ground-on caps. Capacity approx. 25 ml.
Each £2·95 ax

DJ-790

PYKNOMETERS, *Technico*, **Lipkin,** to IP 189. Subdivided in 1 mm on each limb.

Capacity	0·25	1	5	10 ml	
Each	£2·30	2·30	2·30	2·85	ax

HYDROMETERS for determination of specific gravity see HT-205 et seq. in List No. sequence.

DESICCATORS

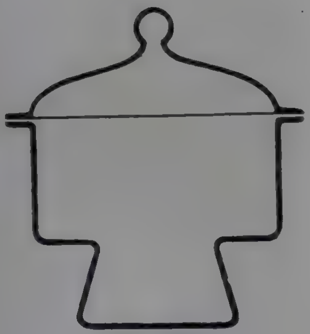
DK-430

DESICCATORS, Scheibler, glass, with knob cover.

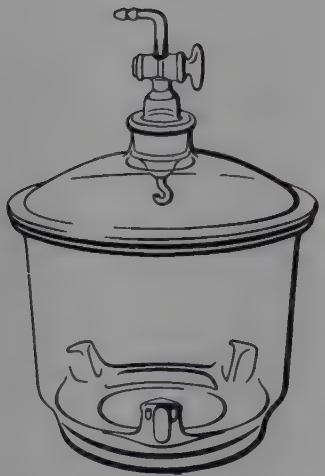
Internal dia.	10	15	20	25 cm	
Each	**£1·67**	**3·64**	**5·68**	**8·54**	*mx*

DK-432 **Lids,** spare, for above.

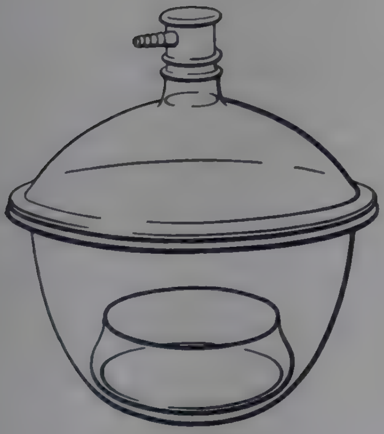
Size	10	15	20	25 cm	
Each	**£0·78**	**1·24**	**2·12**	**3·01**	*mx*



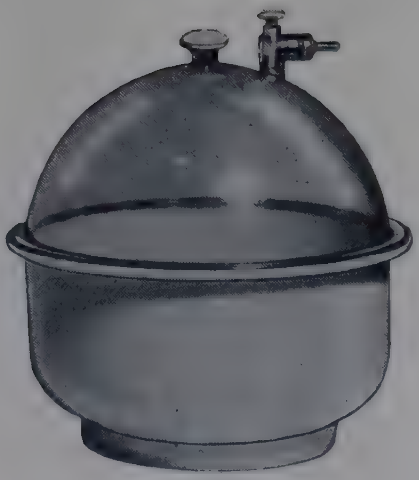
DK-430



DK-465



DK-490



DK-530

DK-602

DK-460

DESICCATORS, *Pyrex* glass, with knob cover but **without disk.**

Internal dia. at top	16·5	22 cm	
To take disk	15	20 cm	
Std. pack qty.	2	2	
Std. pack	**£8·80**	**13·50**	*jx*
Each	**£4·50**	**7·00**	

DK-465

DESICCATORS, *Pyrex* glass as DK-460 but vacuum pattern with ground in interchangeable stopcock. **Without disk.**

Internal dia. at top	16·5	22 cm	
To take disk	15	20 cm	
Joint size	24/29	34/35	
Std. pack qty.	2	2	
Std. pack	**£14·50**	**19·45**	*jx*
Each	**£ 7·40**	**10·00**	

REPLACEMENT PARTS for DK-465

DK-468 **Lid** with stopcock.

Joint size	24/29	34/35	
Std. pack qty.	2	2	
Std. pack	**£9·05**	**11·65**	*jx*
Each	**£4·70**	**6·00**	

DK-469 **Stopcock** only.

Joint size	24/29	34/35	
Std. pack qty.	2	2	
Std. pack	**£3·65**	**3·95**	*jx*
Each	**£1·90**	**2·05**	

ACCESSORY for DK-460 and DK-465

DK-470 **Disk,** porcelain.

Diameter	15	20 cm	
Each	**£3·00**	**4·15**	*cx*

DK-490

DESICCATOR, *Pyrex* glass, **BLWA pattern,** for vacuum use. With cover, interchangeable stopcock, and acid tray. Top dia. inside flange 29·5 cm. Plate dia. 25·5 cm.
Std. pack of 2 **£24·90** Each **£13·00** *jx*

REPLACEMENT PARTS

DK-492	**Cover** ...	Std. pack of 2	**£ 15·00**	Each	**£7·80**	*jx*
DK-494	**Stopcock** ...	Std. pack of 2	**£ 1·30**	Each	**£0·68**	*jx*
DK-496	**Acid tray** ...	Std. pack of 2	**£ 3·20**	Each	**£1·65**	*jx*

ACCESSORY

DK-498 **Plate, porcelain** ... ... Each **£5·00** *cx*

***DK-530**

DESICCATORS, plastics, vacuum pattern, suitable for pressures down to 5 torr. With polypropylene base and desiccant tray, and tough transparent polycarbonate lid. An elastomer ring located in an annular groove in the flange is compressed by the lid and so forms a seal without the use of grease.

Diameter	15	20	25 cm	
Each	**£6·00**	**8·35**	**11·80**	*mx*

ACCESSORIES for DESICCATORS

DK-580 **Desiccator disks, perforated zinc.**

Diameter	9·5	14·5	19	23 cm	
Ten	**£1·30**	**1·90**	**2·30**	**2·70**	*cx*
Each	**£0·20**	**0·25**	**0·30**	**0·33**	

DK-602 **Desiccator guard,** polythene coated steel. Internal dimensions 35 cm dia. × 26 cm high with sides slightly tapered ... ... Each **£7·20** *cx*

DESICCATOR CABINET

For desiccating, storing, UV and ethylene oxide sterilising, plant growth and many other applications.

- **Material easily cut, drilled or re-plugged for user's own modifications and requirements**
- **Excellent all-round visibility, combined with robustness and high quality finish**
- **Perspex permits both external UV and visible light irradiation and external magnetic stirring if required**
- **Good airtightness ensured by neoprene door gasket compressed by snap-fastening door catch**

DK-640

DESICCATOR CABINET, clear Perspex, with hinged door fitted with neoprene gasket. Includes two polystyrene desiccant trays and one plated 12·5 mm grid wire shelf.

In normal use the trays occupy the base and the shelf is used as the floor of the cabinet. Other arrangements are possible; supports are fixed 12·5 cm from the top, upon which one desiccant tray may be located and used as a shelf. External lugs are fitted for safe stacking of one cabinet on another.

Dimensions 35×34·5×38 cm high overall.

Each **£36·00** *bx*

DK-640

DK-660

DESICCANT CAPSULE, silica gel, in perforated tin container. Suitable for use in balance cases and desiccator cabinets. Diameter 63 mm, height 13 mm.

Ten **£9·00** Each **£1·00** *cx*

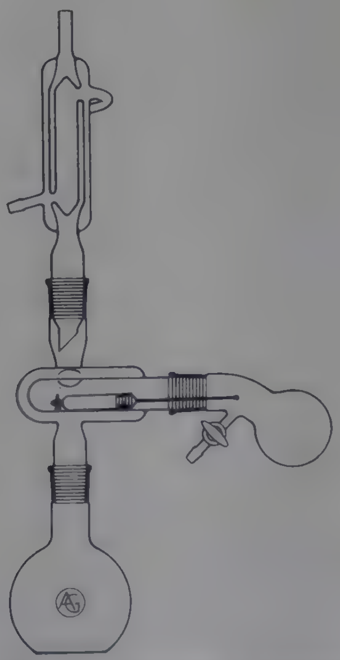
DK-665

DESICCANT, silica gel, self indicating, in 1 lb (450 g) tins ... ... 10 tins **£8·00** Tin **£0·90** *cx*

DK-710

DESICCATOR, SEMI-MICRO, (AG), constant temperature vacuum pistol pattern, for drying temperature sensitive substances in the presence of a drying agent. The drying chamber, which is surrounded by a vapour jacket, contains the weighing pig which is fitted with a loop and long-handled stopper so that the pig can be hooked on an ear in the drying chamber and opened or closed while in position. The drying agent flask with stopcock for vacuum control is connected by means of a 29/32 joint, and the vapour jacket has 29/32 joints for assembling with the requisite boiling flask and condenser.

Each **£9·85** *ax*



DK-710 with accessory condenser and boiling flask

REPLACEMENT PARTS

DK-712	**Main glass part**	Each	**£3·25**	*ax*
DK-714	**Drying agent flask**	Each	**£3·00**	*ax*
DK-716	**Weighing pig,** for boats up to 33 mm long. Inside dia. 8–9 mm with ring at closed end, two feet and long handled ground-in stopper	Each	**£3·60**	*ax*

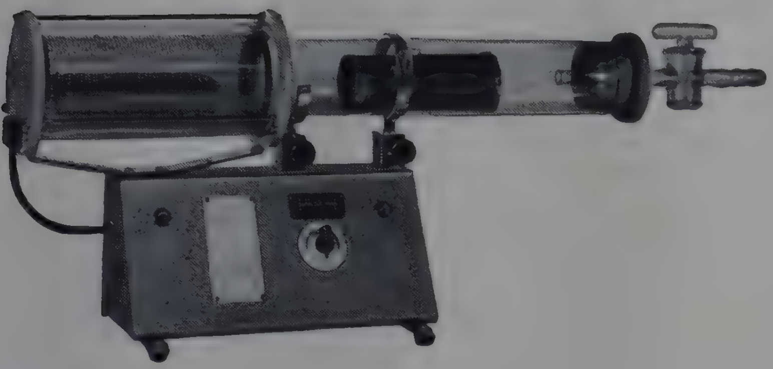
ACCESSORIES

FJ-110	**Flask,** flat bottom, 500 ml, 29/32 socket...	For prices see entries in List No. sequence.
CU-520	**Condenser,** Davies double surface, 15 cm, cone 29/32	
Q-SB29	**Stopper,** cone 29/32, for closure of drying agent holder when not in use	

Gallenkamp HEATED VACUUM DESICCATORS

For heating materials, under vacuum and in the presence of a drying agent, in the range 50 to 150°C.

- **Borosilicate glass heater tube**
- **Alternative sizes of drying tube**
- **Energy regulator control**
- **Temperature indication by placing accessory thermometer in drying tube**



DK-720
(DK-725 is similar)

DK-720

HEATED VACUUM DESICCATOR, *Gallenkamp*, with borosilicate glass **drying tube 75 × 500 mm,** stopcock, sample boat, gauze cylinder for desiccant, heater tube and control box. For 220/240V a.c. single phase supplies ... ... Each **£68·50** *bx*

REPLACEMENT PARTS

DK-722	**Drying tube,** 75 × 500 mm	Each	**£2·35**	*ax*
DK-723	**Sample boat,** stainless steel	Each	**£2·50**	*bx*
DK-724	**Stopcock,** borosilicate glass	Each	**£3·65**	*ax*
DK-732	**Heater tube**	For prices see entries in List No. sequence below.		
DK-734	**Heater jacket**			

DK-725

HEATED VACUUM DESICCATOR, *Gallenkamp*, with borosilicate glass **drying tube 40 × 600 mm,** end caps, double bore stopcock, desiccant boat, heater tube and control box. For 220/240V a.c. single phase supplies. Each **£63·00** *bx*

REPLACEMENT PARTS

DK-727	**Drying tube,** 40 × 600 mm, with stopcock.	Each	**£5·70**	*ax*
DK-728	**End cap,** 40/38 socket	Each	**£1·20**	*ax*
DK-729	**Desiccant boat,** glass	Each	**£1·05**	*ax*
DK-732	**Heater tube, wound**	Each	**£6·50**	*bx*
DK-734	**Heater jacket**	Each	**£3·05**	*ax*

ACCESSORIES for DK-720 and DK-725

VB-882	**Apiezon grease**	For prices see entries in List No. sequence.
DK-665	**Desiccant,** silica gel ...	
TJ-050	**Thermometer,** 0–200°C ...	

DIALYSIS

***DL-620**

DIALYSIS TUBING, *Visking*, transparent, seamless, viscose cellulose. Thickness 0·32 mm. Supplied flat.

Inflated dia.	6	14	19	28	70 mm	
Flat width approx.	10	22	30	45	110 mm	
Length	30	30	30	30	15 metres	
Per length	**£8·00**	**3·50**	**3·50**	**3·50**	**7·50**	*mx*

DL-800

DIGESTION BOMB

For dissolving silicates, rocks, glass, nitrates and refractories in hydrofluoric and other strong mineral acids at temperatures up to 150°C without volatilisation losses.

Comprises a removable ptfe cup, 25 ml capacity, with cover in a metal bomb. The bomb is sealed by hand tightening a metal cap and the closure is spring loaded to remain gas tight during the heating and cooling periods.

***DL-800**

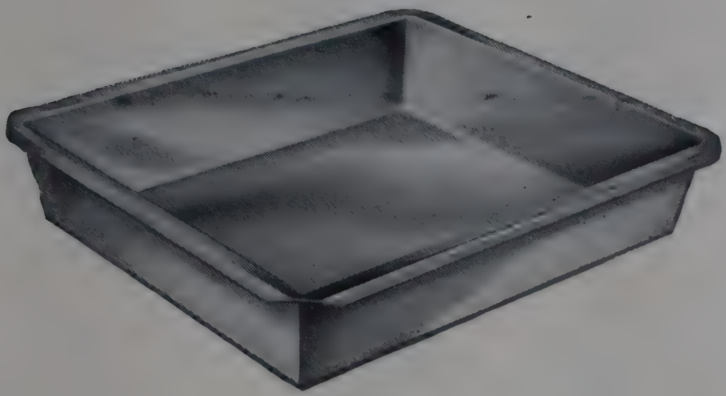
DIGESTION BOMB, comprising 25 ml ptfe cup with cover and metal bomb with sealing cap. Dimensions 67 mm dia. × 97 mm high overall, cup 30 mm dia. × 36 mm deep internal; net weight 970 g. For use at maximum temperature of 150°C and with maximum internal pressure of 80 kgf/cm² ... ... Each **£88·50** *mx*

ACCESSORIES

***DL-804**	**Cup, ptfe, with cover,** capacity 25 ml.	Each	**£21·50**	*mx*

OV-010 et seq. **Ovens,** to heat DL-800. For details see entries in List No. sequence.

DISHES



DM-240

DM-240

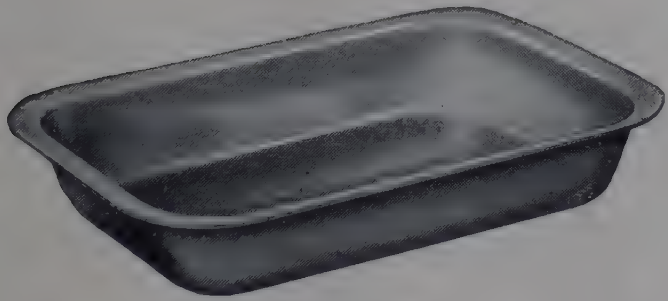
DISHES, photographic developing, stainless steel, 5·5 cm deep.

For plate	25×20 10× 8	30×25 12×10	38×30 cm 15×12 in	
Each	**£5·00**	**6·00**	**7·00**	*cx*

DM-250

DISHES, photographic developing, high impact polystyrene, 5·5 cm deep.

For plate	25×20 10× 8	30×25 12×10	38×30 cm 15×12 in	
Ten	**£3·40**	**5·60**	**7·40**	*cx*
Each	**£0·40**	**0·62**	**0·82**	



DM-260

DM-260

DISHES, dissecting, aluminium, seamless, with smooth flat flange. Height 5·7 cm.

Dimensions	35×29	40×33 cm	
Each	**£1·30**	**1·80**	*cx*

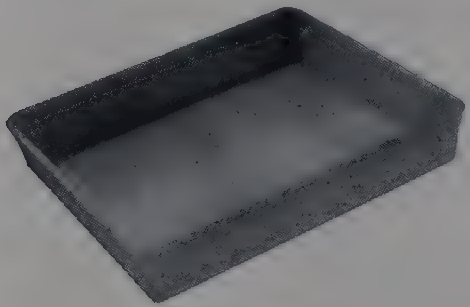
DISHES, combustion	see BOATS
DISHES, crystallising	see BASINS
DISHES, evaporating	
DISHES, moisture in coal	
DISHES, porcelain	
DISHES, micro-diffusion	see MEDICAL SCIENCES
DISHES, Petri	see CULTURE APPARATUS
DISHES, staining	see HISTOLOGY

DM-265

DM-265

DISHES, dissecting, glass, with polished edges.

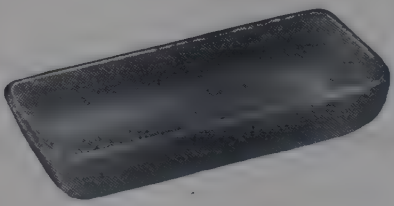
Length	20	25	30	37 cm	
Width	10	15	20	22 cm	
Height	5	5	5	7 cm	
Each	**£1·00**	**1·70**	**2·50**	**4·00**	*cx*



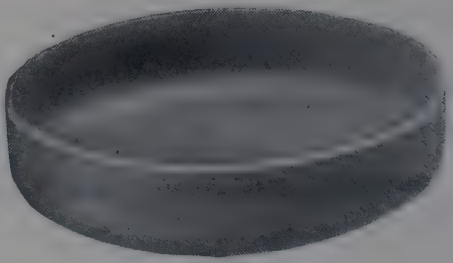
DM-270

DM-270

DISH, polypropylene, rectangular shape with tapered sides. Suitable for use as an instrument tray. Nominal internal dimensions 30×25×5 cm deep.
Ten **£9·40** Each **£1·04** *cx*



DM-280



DM-285

DM-280

DISHES (ignition capsules), *Vitreosil,* glazed translucent silica, rectangular. Capacity 35 ml. Dimensions 52×42×18 mm deep ... Ten **£9·10** Each **£1·02** *fx*

DM-285

DISHES (ignition capsules), *Vitreosil,* glazed translucent silica, circular, deep form. Height 28 mm.

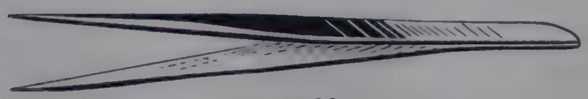
Capacity	45	80	100 ml	
Diameter	56	75	87 mm	
Ten	**£11·00**	**13·50**	**15·20**	*fx*
Each	**£ 1·25**	**1·50**	**1·75**	

DM-290

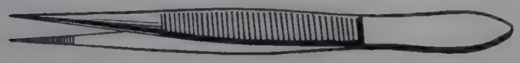
DISHES (ignition capsules), *Vitreosil,* as DM-285 but shallow form. Height 15 mm, except largest which is 18 mm high.

Capacity	10	15	20	50 ml	
Diameter	39·5	48	54	78 mm	
Ten	**£5·80**	**5·80**	**7·80**	**11·00**	*fx*
Each	**£0·64**	**0·64**	**0·86**	**1·25**	

DISSECTING EQUIPMENT


DR-010

DR-010
FORCEPS, Boley pattern, nickel plated steel with fine points. Overall length 12·5 cm.
Ten **£3·70** Each **£0·43** *cx*

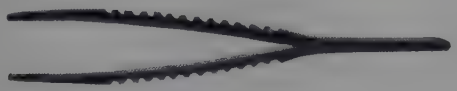

DR-020, DR-022

*__DR-020__
FORCEPS, nickel plated steel, straight with guide pin and fine points.

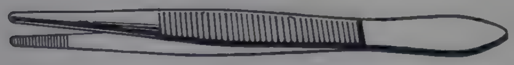
Length	11·5	12·5	15 cm	
Ten	**£3·20**	**3·40**	**3·70**	*cx*
Each	**£0·38**	**0·40**	**0·43**	

DR-022
FORCEPS, as DR-020 but stainless steel.

Length	11·5	12·5	15 cm	
Ten	**£8·00**	**8·00**	**8·40**	*cx*
Each	**£0·90**	**0·90**	**0·94**	

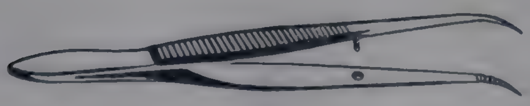

DR-029

DR-029
FORCEPS, reinforced black nylon, with corrugated blunt points, length 12·5 cm. These forceps have excellent mechanical strength and will withstand autoclave or dry heat sterilisation.
50 **£4·10** Ten **£0·88** Each **£0·16** *cx*


DR-030, DR-032

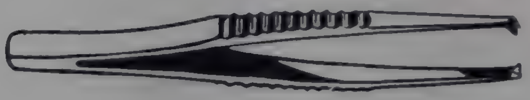
*__DR-030__
FORCEPS, nickel plated steel, straight with guide pin and blunt points, 12·5 cm long.
Ten **£3·20** Each **£0·38** *cx*

DR-032
FORCEPS, as DR-030 but stainless steel.
Ten **£8·00** Each **£0·90** *cx*


DR-040, DR-042

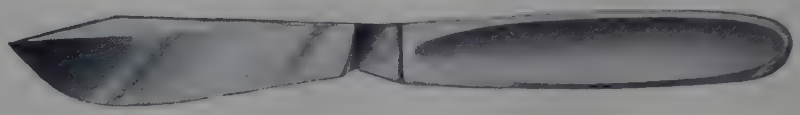
*__DR-040__
FORCEPS, nickel plated steel, curved with guide pin and fine points, 12·5 cm long.
Ten **£3·20** Each **£0·38** *cx*

DR-042
FORCEPS, as DR-040 but stainless steel.
Ten **£8·80** Each **£0·98** *cx*

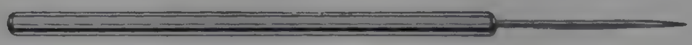

DR-050

DR-050
FORCEPS, Treve's rat tooth, stainless steel, 12·5 cm long ... ... Ten **£13·60** Each **£1·50** *cx*

HJ-550
FORCEPS, microscope slide, with spatulate ends. For price and details see entry in List No. sequence.


DR-100

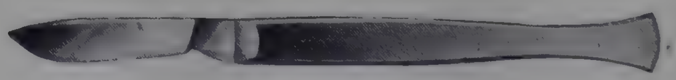
DR-100
KNIFE, CARTILAGE, carbon steel, with 8·3 cm blade.
Ten **£35·00** Each **£3·90** *cx*


DR-150

DR-150
NEEDLE, all stainless steel. Length of needle 35 mm.
Ten **£1·90** Each **£0·25** *cx*

DR-155
NEEDLE, stainless steel, with cedarwood handle. Length of needle 35 mm. In pack of 10 ... Pack **£0·30** *cx*

DR-160
NEEDLE, with lancet point, 45 mm long, 5 mm wide, with hardwood handle with brass ferrule.
Ten **£4·20** Each **£0·47** *cx*

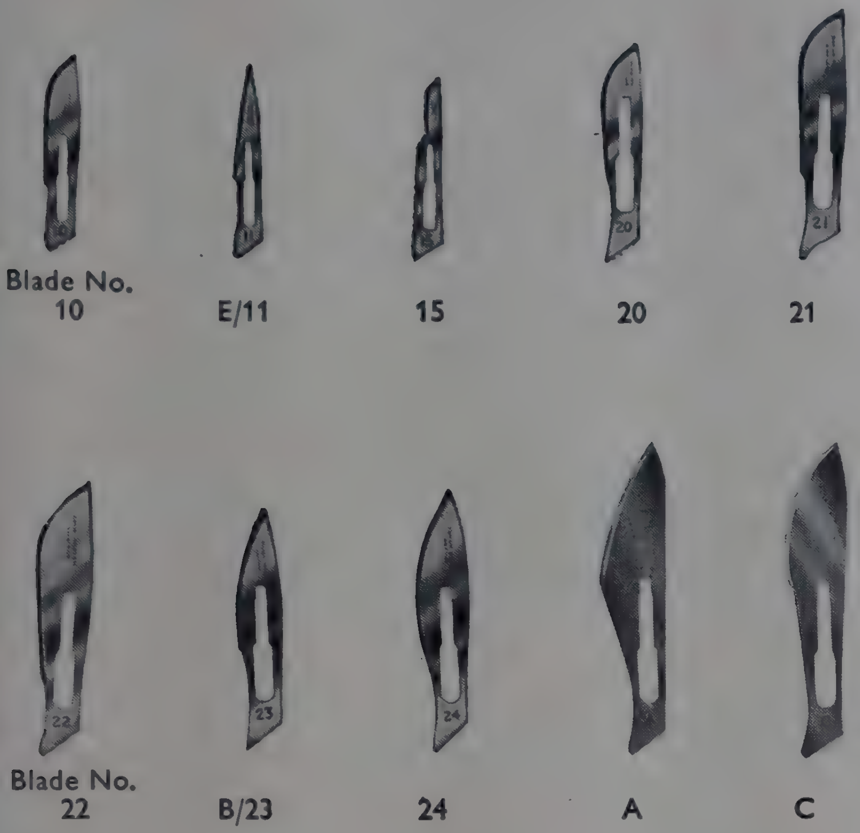

DR-220, DR-230

*__DR-220__
SCALPELS, carbon steel blade and handle.

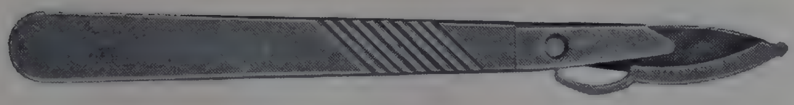
Length of blade	3·8	4·5	4·8	5·4 cm	
Ten	**£3·40**	**3·40**	**3·40**	**3·40**	*cx*
Each	**£0·40**	**0·40**	**0·40**	**0·40**	

DR-230
SCALPELS, stainless steel blade and handle.

Length of blade	3·8	4·5	4·8	5·4 cm	
Ten	**£7·80**	**7·80**	**7·80**	**7·80**	*cx*
Each	**£0·86**	**0·86**	**0·86**	**0·86**	



Blade No's and shapes for DR-240, DR-254 and DR-264.



DR-240

DR-240

SCALPELS, with stainless steel blade and integral polystyrene handle and blade guard. Individually packed in sterile peel-open foil sachets. Lengths quoted are those of the cutting edge. In packs containing 10 scalpels.

Blade No.	10	E/11	15	20	21	
Length approx.	25	15	10	25	30 mm	
10 packs	**£7·40**	**7·40**	**7·40**	**7·40**	**7·40**	*mx*
Pack	**£0·82**	**0·82**	**0·82**	**0·82**	**0·82**	

Blade No.	22	B/23	24	A	C	
Length approx.	40	25	30	30	30 mm	
10 packs	**£7·40**	**7·40**	**7·40**	**7·40**	**7·40**	*mx*
Pack	**£0·82**	**0·82**	**0·82**	**0·82**	**0·82**	

MADE IN ENGLAND

DR-250
DR-260

DR-250

SCALPEL BLADE HOLDER, No. 3, for blades DR-254.
Ten **£3·90** Each **£0·45** *mx*

DR-254

SCALPEL BLADES, stainless steel, for holders DR-250. The lengths quoted are those of the actual cutting edge. In packs of 10.

Blade No.	10	E/11	15	
Length approx.	25	15	10 mm	
Pack	**£0·35**	**0·35**	**0·35**	*mx*

DR-260

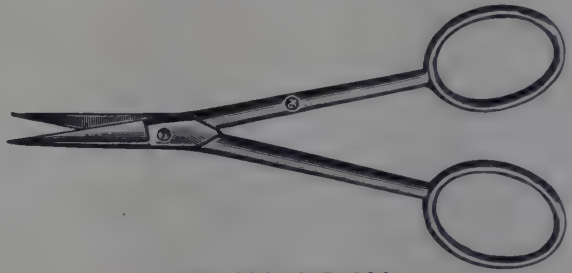
SCALPEL BLADE HOLDER, No. 4, for blades DR-264.
Ten **£3·70** Each **£0·43** *mx*

DR-264

SCALPEL BLADES, stainless steel, for holder DR-260. The lengths quoted are those of the actual cutting edge. In packs of 10.

Blade No.	20	21	22	B/23	
Length approx.	25	30	40	30 mm	
Pack	**£0·35**	**0·35**	**0·35**	**0·35**	*mx*

Blade No.	24	A	C	
Length approx.	30	30	30 mm	
Pack	**£0·35**	**0·35**	**0·35**	*mx*



DR-320, DR-321

***DR-320**

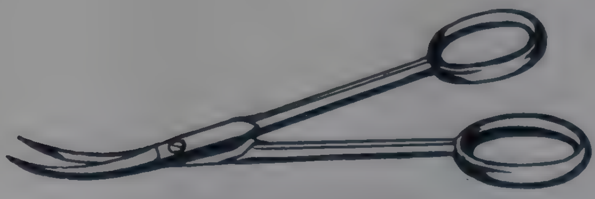
SCISSORS, nickel plated steel, open shanks, straight with fine points.

Length	11·5	12·5	15 cm	
Ten	**£2·90**	**3·00**	**3·80**	*cx*
Each	**£0·35**	**0·36**	**0·44**	

DR-321

SCISSORS, as DR-320 but stainless steel.

Length	11·5	12·5	15 cm	
Ten	**£11·40**	**12·40**	**16·50**	*cx*
Each	**£ 1·30**	**1·40**	**1·85**	



DR-330, DR-332

***DR-330**

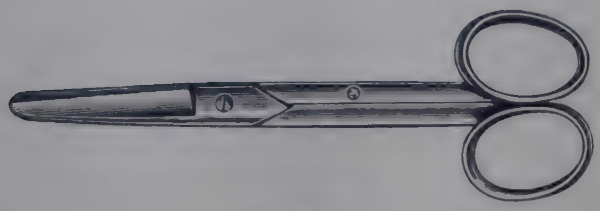
SCISSORS, nickel plated steel, open shanks, curved with fine points.

Length	11·5	12·5 cm	
Ten	**£2·40**	**2·80**	*cx*
Each	**£0·30**	**0·34**	

DR-332

SCISSORS, as DR-330 but stainless steel.

Length	11·5	12·5 cm	
Ten	**£12·40**	**17·00**	*cx*
Each	**£ 1·40**	**1·90**	



DR-340

***DR-340**

SCISSORS, nickel plated steel, closed shanks, straight with blunt points.

Length	12·5	15 cm	
Ten	**£3·40**	**3·90**	*cx*
Each	**£0·40**	**0·45**	

DR-342

SCISSORS, as DR-340 but stainless steel.

Length	12·5	15 cm	
Ten	**£14·00**	**17·00**	*cx*
Each	**£ 1·55**	**1·90**	

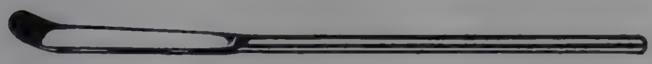
SB-620

SCISSORS, nickel plated steel

SB-622

SCISSORS, stainless steel

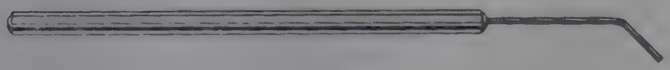
For details and prices see entries in List No. sequence.



DR-400

DR-400

SECTION LIFTER, stainless steel. Length of blade 55 mm ... ... Ten **£2·50** Each **£0·31** *cx*



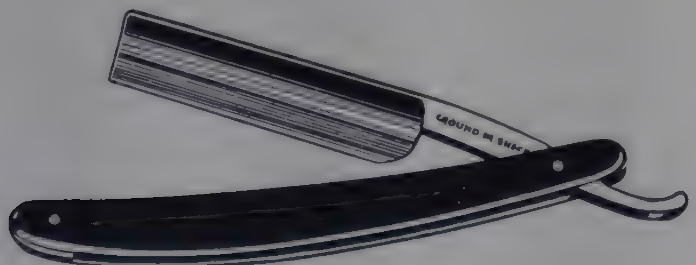
DR-460

DR-460

SEEKER, all stainless steel. Length of probe 40 mm. Ten **£2·20** Each **£0·29** *cx*

DR-470

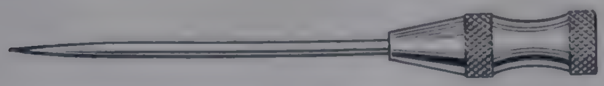
SEEKER, stainless steel probe, with cedarwood handle. Length of probe 35 mm ... ... Pack of 10 **£0·30** *cx*



DR-500

DR-500

SECTION RAZOR, carbon steel, with one flat surface. Length of blade 75 mm ... Ten **£10·00** Each **£1·10** *cx*



DR-525

DR-525

DISSECTING AWL, with stainless steel spike, in milled brass handle. Length of spike 48 mm. Ten **£0·70** Each **£0·14** *cx*

DISSECTING SETS

DR-560

DR-550

DISSECTING SET, STUDENT, in plastics wallet, with the following instruments.

DR-020/030	2 prs forceps, 12·5 cm
DR-155	2 needles
DR-220	3 scalpels (one each 3·8, 4·8 and 5·4 cm)
DR-320	1 pr scissors, 12·5 cm
DR-400	1 section lifter
DR-470	1 seeker

Set **£3·10** *cx*

DR-560

DISSECTING SET, in plastics wallet, with the following instruments, all of stainless steel except DR-500.

DR-022/032/042	3 prs forceps, 12·5 cm
DR-150	2 needles
DR-230	4 scalpels (one each 3·8, 4·5, 4·8 and 5·4 cm)
DR-321	2 prs scissors (one each 11·5 and 12·5 cm)
DR-332	1 pr scissors, 11·5 cm
DR-400	1 section lifter
DR-460	1 seeker
DR-500	1 section razor

Set **£12·70** *cx*

Details of other equipment used for dissection will be found under the following entries.

DM-260	**DISHES,** dissecting, aluminium.
DM-265	**DISHES,** dissecting, glass.
DM-270	**DISHES,** dissecting, polypropylene.
MA-795	**MAGNIFIER,** Falmer.
MA-805	**MAGNIFIER,** aspheric, plastics lens.
ML-310 et seq.	**MICROSCOPES,** stereoscopic, *Olympus*.
MP-600 et seq.	**MICROMANIPULATORS.**
RJ-550	**FREEZER AEROSOL** for freezing specimens before dissection.

***DR-570**

DISSECTING MAGNIFIER, *Olympus* Model DM-2 with interchangeable ×10 and ×20 achromatic lenses. The cast base carries a vertical column on which are mounted the rack and pinion focusing assembly and the working stage. This square stage 60×60 mm can be used with either the clear glass or the frosted glass plates supplied; it is fitted with slip-on hand rests and with slide clips. Illumination is provided by means of a fully adjustable plano-concave mirror. The lenses are held by a double jointed arm which allows examination of any part of the stage. Complete in wooden case with carrying handle.
Each **£17·00** *px*

As exclusive Distributors in the United Kingdom only for biological microscopes made in Japan by Olympus Optical Co. Ltd. we are unable to offer for sale outside this territory.

DR-570

DR-580

DISSECTING MAGNIFIER, *Prior*, with interchangeable ×5 and ×10 doublet lenses. A heavy horseshoe foot carries a vertical column upon which the rack and pinion focusing assembly and the working stage are mounted. The stage has a central clear glass disk either side of which arm rests are fitted. The magnifying lens is held by a double jointed arm enabling examination of any part of the glass stage to be made. Transmitted illumination is provided by a movable mirror with opal glass reverse face ... ... Each **£25·00** *fxN*

DR-580

DR-585

DISSECTING MAGNIFIER, *Prior*, as DR-580 but fitted with **wide field** aplanatic lenses ×5 and ×10.
Each **£27·50** *fxN*

ACCESSORY

DR-588 **Case,** with lock and key ... ... Each **£4·25** *fxN*

EMBEDDING APPARATUS

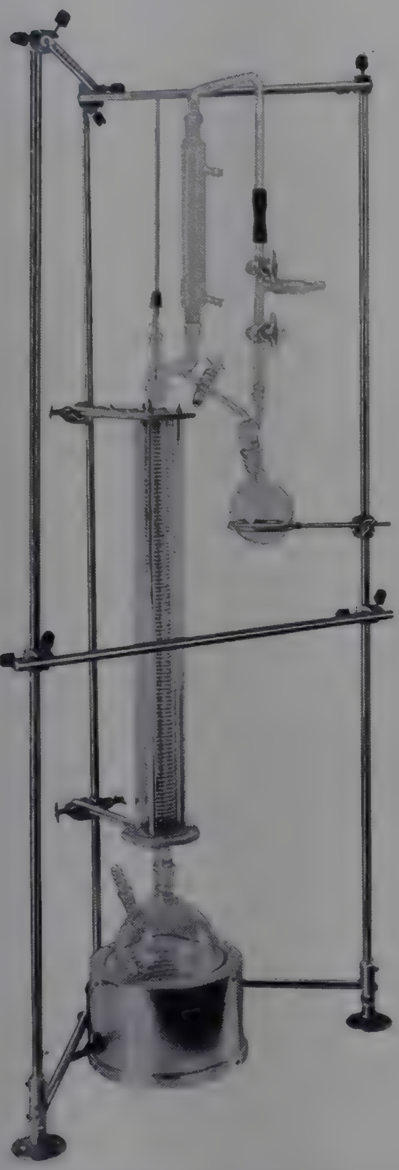
HJ-040	**Wax Embedding Bath,** *Gallenkamp*, maximum temperature 100°C, thermostatic control to ±0·2degC.
HJ-100	**Wax Embedding Oven,** *Gallenkamp*, maximum temperature 100°C, thermostatic control to ±1degC.
HJ-145	**Wax Heater/Dispenser,** *Gallenkamp*, maximum temperature 100°C.
HJ-185	**Embedding Trays,** polystyrene with ten recesses each 20×20×13 mm deep.
HJ-190	**Floating-out Bath,** *Gallenkamp*, maximum temperature 80°C.
HJ-230/235	**Vacuum Embedding Baths,** single and double pan models, maximum temperature 82°C.

For full details and prices of above see entries in List No. sequence.

Gallenkamp

Gallenkamp FRACTIONAL DISTILLATION ASSEMBLY

For fractional distillation of liquids at atmospheric or reduced pressures.



DT-520 with DT-538 and HD-500

- **Borosilicate glass components fitted with interchangeable joints where applicable**
- **Theoretical plate value 12 to 15 plates**
- **Double walled heated jacket gives reasonably adiabatic conditions**
- **Column can be viewed during distillation**
- **Variable take-off stillhead. Accessory with controlled reflux ratio available**

DT-520

FRACTIONAL DISTILLATION APPARATUS, *Gallenkamp*, comprising glassware listed below, rheostat for adjusting heating jacket temperature, thermometers, grease and wax for joints and instructions manual. For 200/250V a.c. single phase supplies ... Each **£77·00** *bx*

REPLACEMENT PARTS

DT-524	**Air leak tube,** borosilicate glass ...	Each	**£1·30**	*ax*
DT-526	**Column,** borosilicate glass, 60 cm long.	Each	**£2·65**	*ax*
DT-528	**Support funnel,** for packing	Each	**£0·60**	*ax*
DT-529	**Heater jacket,** borosilicate glass, double-walled. Overall length 53 cm	Each	**£9·80**	*ax*
DT-530	**Stillhead,** borosilicate glass, total condensation, variable take-off pattern	Each	**£9·00**	*ax*
DT-536	**Calcium chloride tube,** borosilicate glass.	Each	**£1·20**	*ax*
DT-537	**Connecting piece,** borosilicate glass, for vacuum distillation, with cone and socket, one 3-way and one 1-way tap, rubber junction and vacuum take-off nozzle with socket	Each	**£9·00**	*ax*
DT-562	**Helices, Fenske,** single turn, (1 pack)...		For prices see entries in List No. sequence.	
DT-564	**Helices, Fenske,** multi-turn, (1 pack)...			
Q-FR 500/3S/1A.	**Distillation flask,** 500 ml ...			
Q-FR 1L/3S/1A.	**Distillation flask,** 100 ml ...			
Q-SB 14	**Stopper**			
Q-C 3/12.	**Condenser,** spiral pattern			
TJ-100	**Thermometer,** range −5 to 360°C ...			
TJ-102	**Thermometer,** range −5 to 360°C ...			
TJ-325	**Thermometer adapter,** for TJ-102 ...			
Q-FR 250/3S.	**Receiver flask,** 250 ml			
Q-FR 500/3S.	**Receiver flask,** 500 ml			
Q-MF 23/2.	**Calcium chloride tube**			

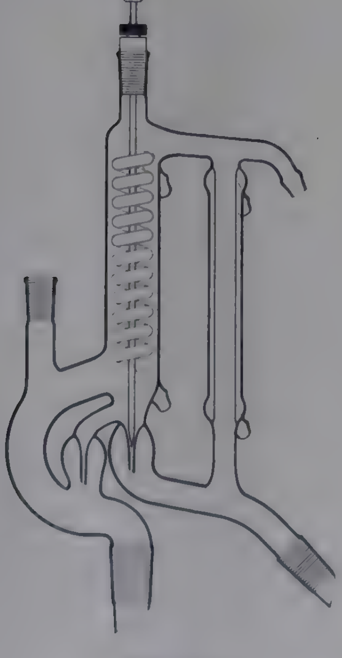
ACCESSORIES

DT-538

SCAFFOLDING SET, *Gallenkamp*, comprising *Lablox* rods, connectors, feet and clamps with bossheads, rings and fixing screws to form a three sided rigid support framework 120 cm high suitable for DT-520. Set **£8·75** *bx*

DT-540

STILLHEAD, ,(AG) borosilicate glass, total condensation; variable take-off with reflux ratio control by rotation of metal rod operating through a stuffing box. For use at atmospheric or reduced pressure. With standard cone joints for column, receiver and thermometer. Each **£24·00** *ax*



DT-540

HD-500

HEATING MANTLES. For prices see entry in List No. sequence.

STILLHEAD

DT-556

STILLHEAD, Ⓐ, with cones 14/15 and thermometer sleeve ... ... Ten **£10·00** Each **£1·12** *ax*

COLUMN FILLINGS

DT-560

RINGS, Rashig, glass, approx. 5 mm dia. × 5 mm long. In pack of 250 g. Filling capacity approx. 300 ml.
10 packs **£10·00** Pack **£1·12** *ax*

DT-562

HELICES, Fenske, single turn, 4 mm dia., borosilicate glass. In pack of 50 g. Filling capacity approx. 100 ml.
5 packs **£8·20** Pack **£1·75** *cx*

DT-564

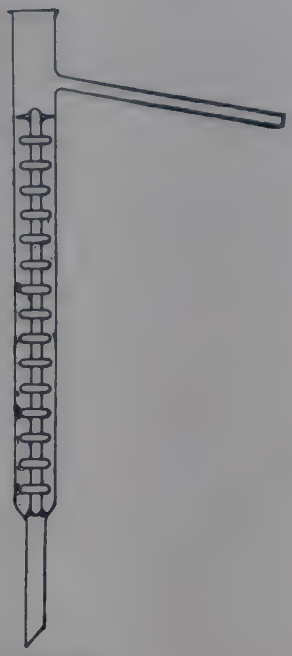
HELICES, Fenske, multi turn, 4 mm dia., borosilicate glass. In pack of 50 g. Filling capacity approx. 150 ml.
5 packs **£9·00** Pack **£1·90** *cx*

COLUMNS

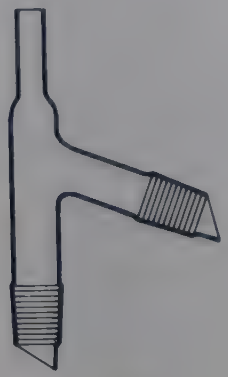
DT-566

FRACTIONATING COLUMNS, Ⓐ, **Young,** rod and disk pattern, **borosilicate glass.**

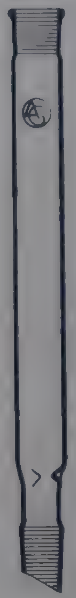
No. of disks	15	20	
Height approx.	53	63 cm	
Ten	**£26·50**	**28·00**	*ax*
Each	**£ 2·95**	**3·10**	



DT-566



DT-556



DT-576

DT-576

FRACTIONATING COLUMN, Ⓐ, **borosilicate glass,** with 14/15 joints. Effective length 110 mm, internal dia. 14 mm with indents at the lower end to support packing. Approximate capacity 20 ml.
Ten **£9·20** Each **£1·02** *ax*

Gallenkamp DISTILLATION and SUBLIMATION BLOCK

For purification by distillation and sublimation at temperatures up to 350°C.

The temperature of the aluminium block is controlled by an integral energy regulator; temperature range 50°C to 350°C, fluctuation about ±2degC.

In operation samples, contained in capsules DT-583, are placed in tubes DT-581 which are then constricted and, after a cotton wool plug has been inserted, are evacuated to at least 0·01 torr. The evacuated tubes are heated in the block at an appropriate temperature until distillation or sublimation is complete.

With liquid samples some fractionation is possible if a thin copper tube is placed around the glass tube where it projects from the block.

- **For 2 to 20 mg samples—solid or liquid**
- **Accommodates three sample tubes**
- **Block can be clamped at any angle up to 45°**

DT-578

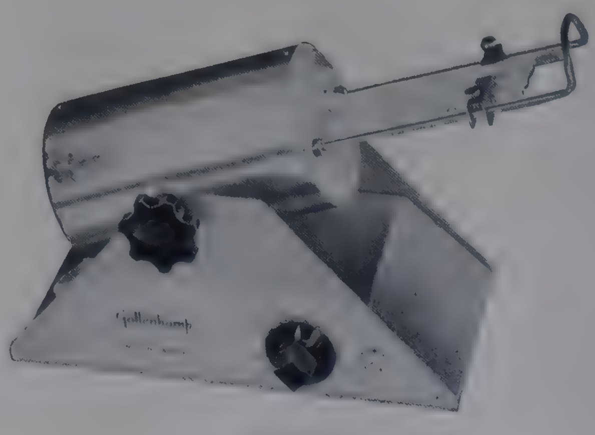
DISTILLATION AND SUBLIMATION HEATING BLOCK, *Gallenkamp*, as specification, with 10 sample tubes, 20 capsules, 'cold finger' and a thermometer. For a.c. single phase supplies only.

For 220/240V	Each	**£65·00**	*bx*
For 200/210V	Each	**£65·50**	*bxN*
For 110/120V	Each	**£65·50**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

DT-581	**Sample tubes,** glass thin walled.	Pack of 10	**£0·30**	*ax*
DT-583	**Capsules**	Pack of 10	**£0·25**	*ax*
TJ-050	**Thermometer,** scale span 0–360°C.	For prices see entries in List No. sequence.		
VB-114	**Vacuum pump**			

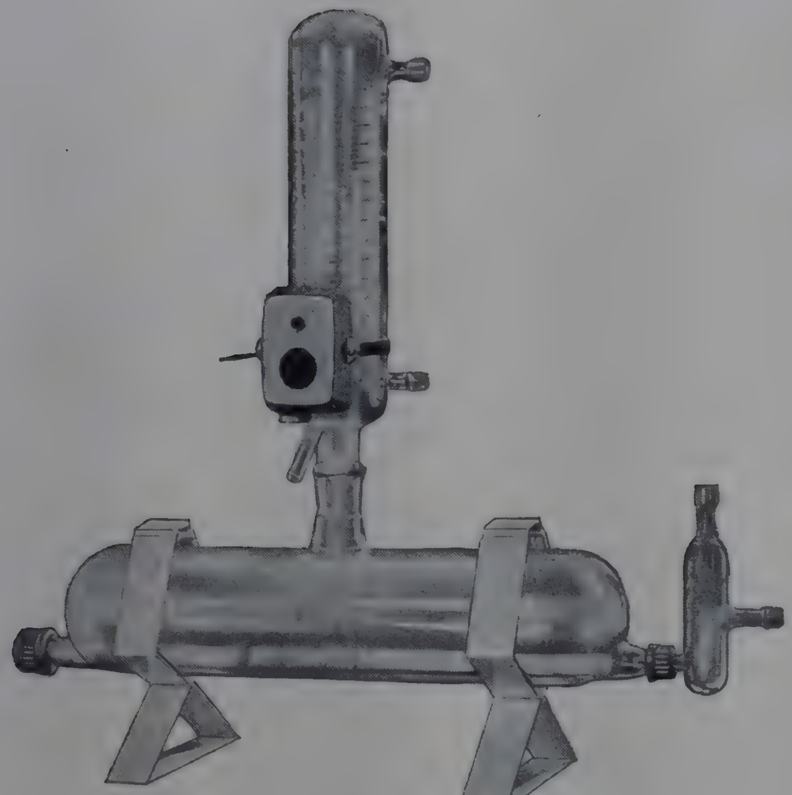


DT-578

ALL-GLASS WATER STILLS

ELECTRICALLY HEATED

- Output approximately 4 litres/hour
- Distillate quality—0·5 to 1×10^6 ohms/cm^3
- Minimum cooling water usage and high efficiency achieved by returning condenser water to still body
- Automatic cut-out operates if water supply fails
- Preset constant level device
- Requires only 80 × 25 cm bench space
- Silica sheathed heating element



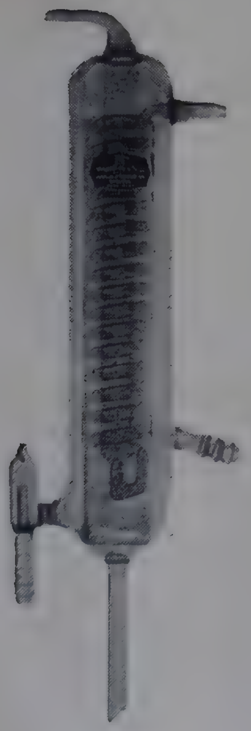
DT-584

DT-584

STILL, glass and ptfe, *Quickfit* **14WSC,** output approximately 4 litres/h of water having an average quality between 0·5 and 1×10^6 ohms/cm^3. Heating is by means of a 3 kW silica sheathed immersion element. With preset constant level device and automatic cut-out. For 190/250V a.c. single phase supplies. Includes two support brackets for wall or bench mounting ... Each **£47·30** *jx*

REPLACEMENT PART

DT-586	**Heater,** 3 kW, *Quickfit* HS3D, silica sheathed. For 190/250V a.c. supplies	Each	**£9·15**	*jx*
DT-587	**Condenser,** *Quickfit* CX13/5, with 34/35 cone.	Each	**£13·45**	*jx*
DT-588	**Stillbody,** *Quickfit* WS1D/5 with 34/35 socket and size 18 and 28 screwthreads complete with fittings.	Each	**£11·85**	*jx*
DT-589	**Constant level,** *Quickfit* WS2	Each	**£2·95**	*jx*



DT-590

STRIP ACTION

DT-590

STILL, strip action, borosilicate glass, for producing distilled water from steam mains, output 4·5 litres/h. Steam enters at the bottom and is fractionated in the air-cooled outer jacket, the steam being stripped of dirt, oil, etc., by the descending water fraction. The clean steam passes over an efficient spiral water condenser and the distilled water emerges at the bottom, while the fraction containing the dirt leaves through a trap. If the mains steam is exceptionally clean, the air jacket can be lagged to reduce the proportion of steam fractionated out, and thus increase the distilled water output. The still does not fur up and its thermal efficiency is high because cold water does not have to be boiled ... Each **£18·20** *fx*

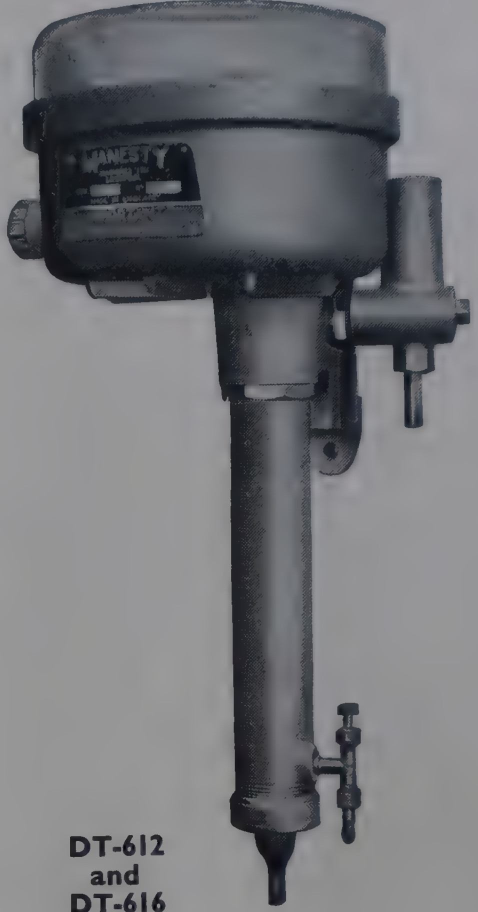
In the U.K. this still is supplied packed in a returnable crate charged at £20 which is refunded on return in good condition.

ACCESSORY

DT-592	**Bracket,** for wall mounting	Each	**£5·00**	*fx*

MANESTY WATER STILLS

DT-602



DT-612
and
DT-616

List No.	Type	Output litres/h	Consumption/h	Height cm	Type of finish	Each	
						£	
DT-602	Destil electric	1·1	1 kW	54	Standard	**30·50**	*fx*
DT-612	OB electric	1·7	1·5 kW	65	Standard	**44·00**	*fx*
DT-613	OB electric	1·7	1·5 kW	65	Vitreous	**52·00**	*fx*
DT-616	OOB electric	3·8 to 4·5	3 kW	75	Standard	**67·00**	*fx*
DT-617	OOB electric	3·8 to 4·5	3 kW	75	Vitreous	**76·00**	*fx*
DT-619	S45 electric	3·8 to 4·5	3 kW	75	Stainless steel	**90·50**	*fx*
DT-620	OOO steam	9	—	115	Standard	**108·00**	*fxN*
DT-622	1B steam	18	—	105	Standard	**200·00**	*fxN*
DT-624	2B steam	36	—	135	Standard	**238·00**	*fxN*

Electric models are available for 100/110 or 220/240V supplies.
When ordering please state voltage and frequency of supply.

All models of this range of water stills for wall mounting have an identical method of operation. Water enters at the base of the condenser, circulates round the condenser tube and fills the boiling chamber to a height controlled by the overflow chamber. The water is pre-heated almost to boiling point by condensing steam before entering the boiling chamber, and dissolved gases are liberated and expelled.

DESTIL MODEL

This low capacity model incorporates a toughened glass inner baffle and a removable condenser tube fitted below the metal lid.

OB and OOB MODELS

These are medium capacity stills available in the standard finish of heat resisting aluminium paint or alternatively with an attractive, corrosion resisting finish where all cast iron parts are vitreous enamelled and the other external parts are chromium plated.
Other parts are common and include a baffle cup, a lid of toughened glass, a condenser tube and an inner baffle of stainless steel.

S45 MODEL

The standard finish for this model is polished stainless steel and all operating parts are stainless steel or borosilicate glass. This model is not available for 100/110V except with a 1500W element producing half the output.

STEAM MODELS

These large capacity models will operate on steam pressures between 1·7 and 4 kgf/cm². Average consumption is 1 kg steam at 2·5 kgf/cm² for each 1 litre distilled water.

REPLACEMENT PARTS

DT-630 **Heating element,** 1000W, for DT-602, with safety device ... ... Each **£3·70** *x*

HD-180 **Heating element,** 1500W, for DT-612 to DT-617, with safety device. For price see entry in List No. sequence.

NOTE: Two elements, HD-180 1500W, required for stills DT-616 and DT-617. One element is used in the 100/110V range for still DT-619.

DT-635 **Heating element,** 3000W, for DT-619, when used on 220/240 volts, with safety device ... Each **£7·45** *fx*

When ordering above elements please state voltage and frequency of supply.

DT-640 **Baffle cup,** toughened glass, for DT-602 to DT-620 inclusive ... ... Each **£0·80** *fx*

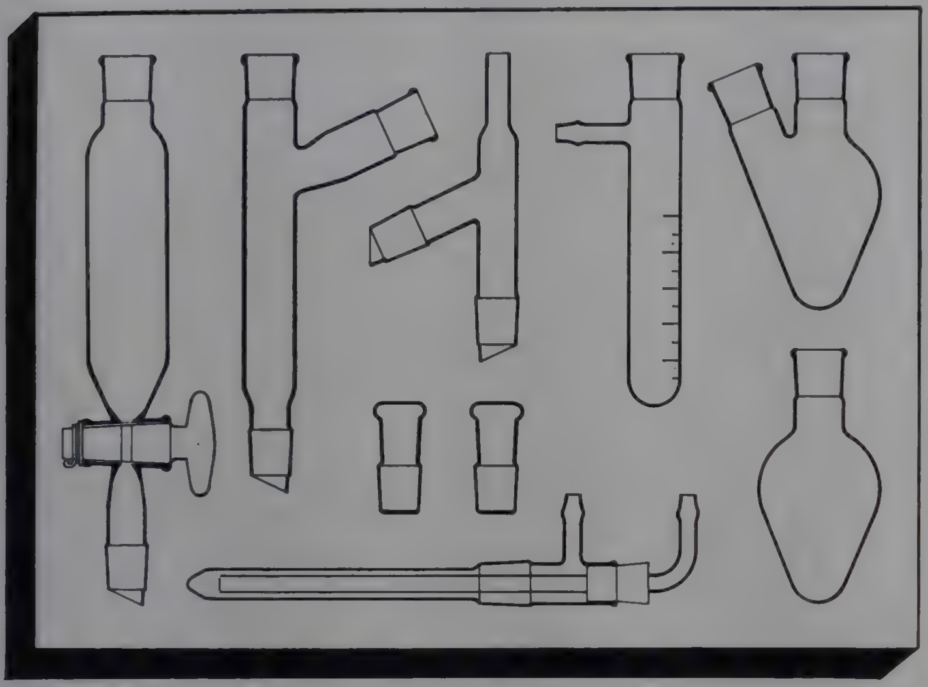
DT-644 **Lid,** toughened glass, for DT-612 to DT-624 inclusive. Each **£3·35** *fx*

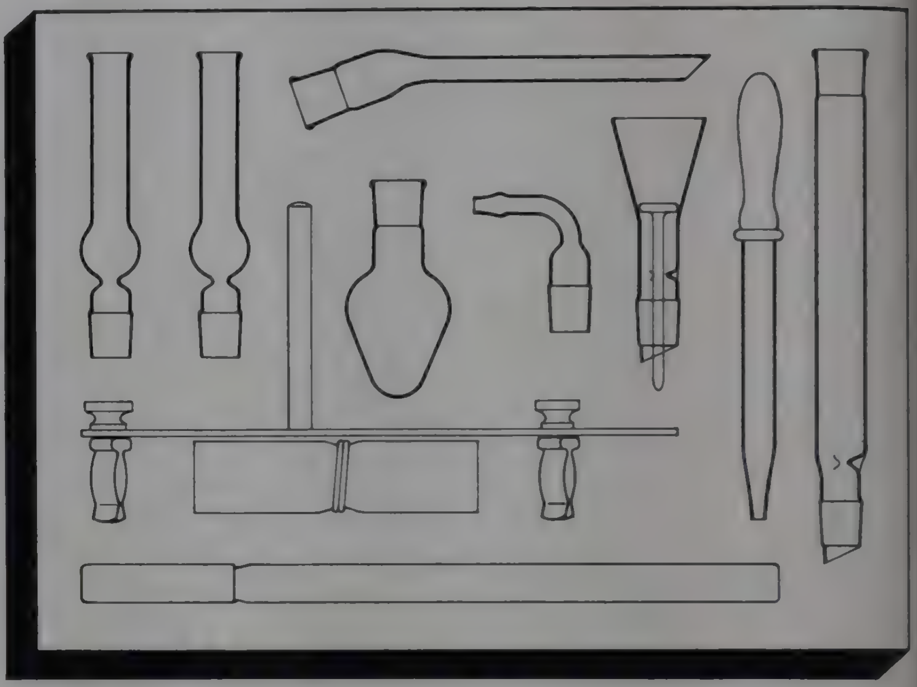
SMALL SCALE PREPARATIVE SETS

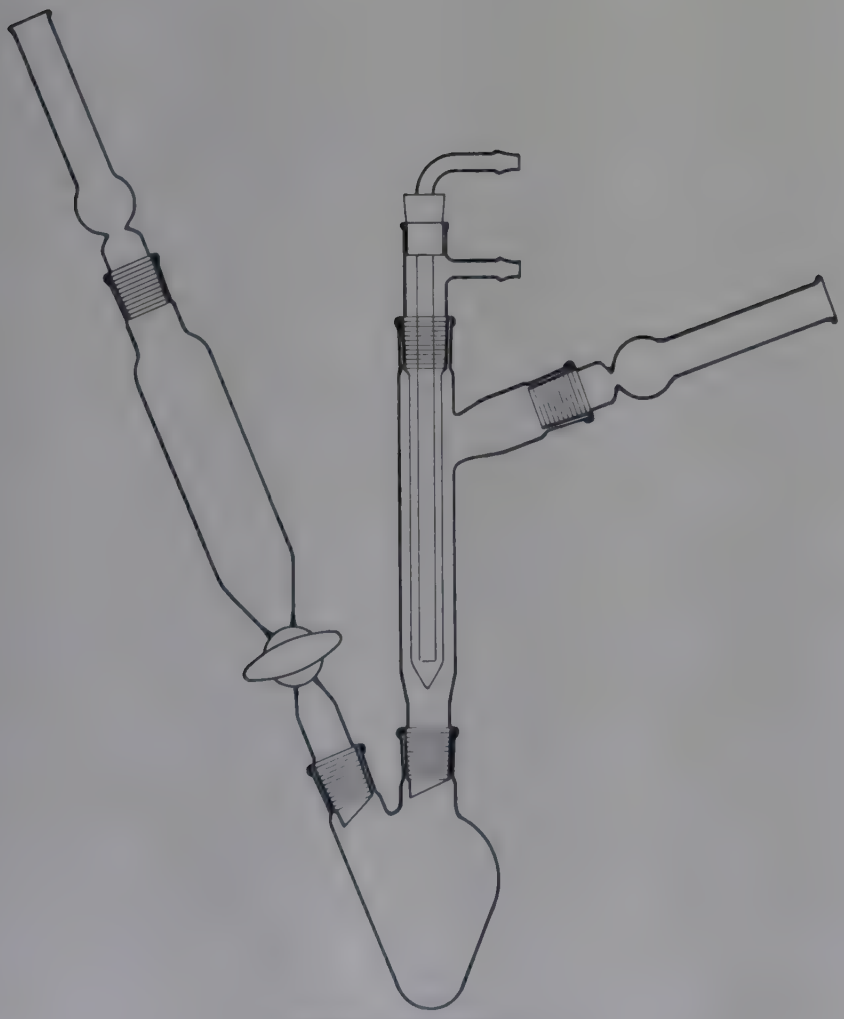
FOR EDUCATIONAL AND INDUSTRIAL ORGANIC CHEMISTRY

Regd.

Teaching manual by J. P. Pearce, B.Sc., A.R.I.C. and F. E. Haddon, B.Sc., A.R.I.C.,
Science Department, Croydon Technical College







Specimen assembly as used for a Grignard reaction

- **Sets**

  The **comprehensive set** retains all the best features of earlier AG sets with design improvements and additional components. It is supplied with an informative teaching manual of techniques and experiments.

  The **abridged set** comprises the more commonly used components only and does not include the teaching manual. It can be used for many experiments and also to supplement the comprehensive set when this is required for two or more simultaneous experiments.

  Both sets are packed in preformed storage trays in stout cartons.

- **Teaching manual**

  The manual by J. P. Pearce and F. E. Haddon is designed to match the developing knowledge of organic chemistry theory as students proceed through 'A' level or O.N.C. courses. A few examples of a more advanced nature demonstrate the suitability of the apparatus for H.N.C. and degree courses.

- **Safety**

  The manual places considerable emphasis on the safety aspect in relation to toxicity, flammability and explosion hazards, all of which are minimised by the careful choice of chemicals used to illustrate the various reactions and the small quantities required.

- **Versatility**

  The sets provide a maximum number of assemblies at minimum cost. All components have 14/15 ground joints.

  The assemblies are practically self supporting and the comprehensive set includes a clamp adaptable to all assemblies.

- **Economy**

  The small scale saves space, reduces time taken in setting up and reduces costs due to the smaller quantities of reagents required.

SMALL SCALE PREPARATIVE SETS

Regd.

COMPONENTS

All glass items in the list are made of borosilicate glass except the dropping pipette and thermometer and all ground joints are size 14/15.

DT-742	**Condenser, 'cold finger'**	Each	**£0·80**	*ax*
DT-744	**Condenser jacket, with side arm,** and two sockets and one cone	Each	**£1·85**	*ax*
DT-556	**Stillhead,** with thermometer tubulure and two cones.			
FJ-195	**Flask, pear shaped.** Capacity 30 ml.			
FJ-196	**Flask, pear shaped,** two neck. Capacity 30 ml.			
FP-587	**Funnel,** cylindrical separating. Capacity 30 ml.			
SU-520	**Stopper.**			
TF-422	**Receiver, graduated, with side arm.** Capacity 10 cm³.			

The abridged set DT-765 contains one each of the above 8 items.

DT-746	**Condenser adapter**	Each	**£0·55**	*ax*
DT-752	**Vacuum adapter**	Each	**£0·70**	*ax*
DT-757	**Rashig rings** for packing DT-576. In pack containing approximately 25 ml	Pack	**£0·15**	*ax*
AB-620	**Absorption tube.**			
DT-576	**Fractionating column.** Packing capacity approximately 20 ml.			
FJ-195	**Flask, pear shaped.** Capacity 10 ml.			
FP-290	**Funnel,** Willstätter filter. Capacity approximately 5 ml.			
PM-580	**Dropping pipette,** capacity approximately 4 ml.			
TJ-058	**Thermometer,** 250°C, subdivided in 2degC.			
SM-685	**Clamp,** adjustable, for supporting assemblies on a retort stand.			

The comprehensive set contains two each AB-620 and SU-520 one each of all 16 other items above and one copy of the teaching manual.

For details of unpriced components see entries in List No. sequence.

SETS

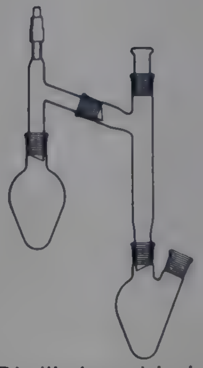
DT-760

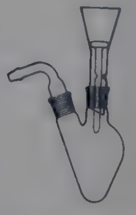
PREPARATIVE SET, Ⓐ, **comprehensive small scale set** of the 20 components listed above. With teaching manual ... ... Set **£20·00** *ax*

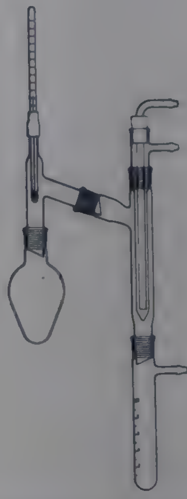
DT-765

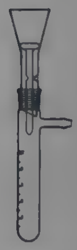
PREPARATIVE SET, Ⓐ, **abridged small scale set** of 8 basic components listed above. Without manual. Set **£10·00** *ax*

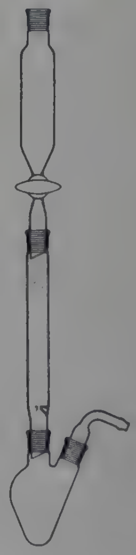
Typical assemblies

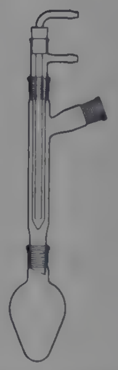

Distillation with air condenser

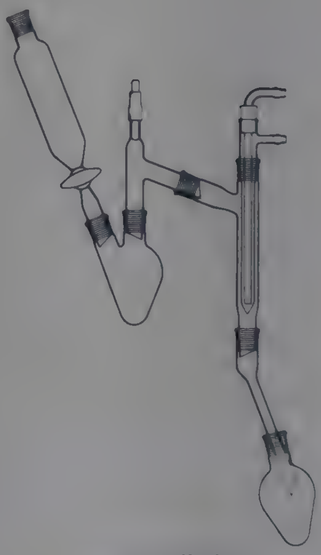

Vacuum filtration

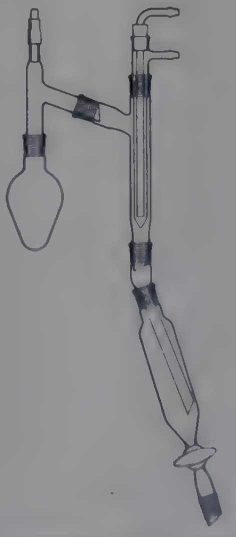

Distillation with water condenser

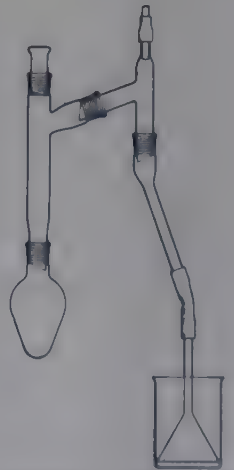

Vacuum filtration

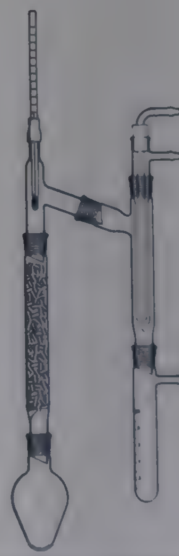

Column chromatography


Reflux distillation with water condenser


Steam distillation

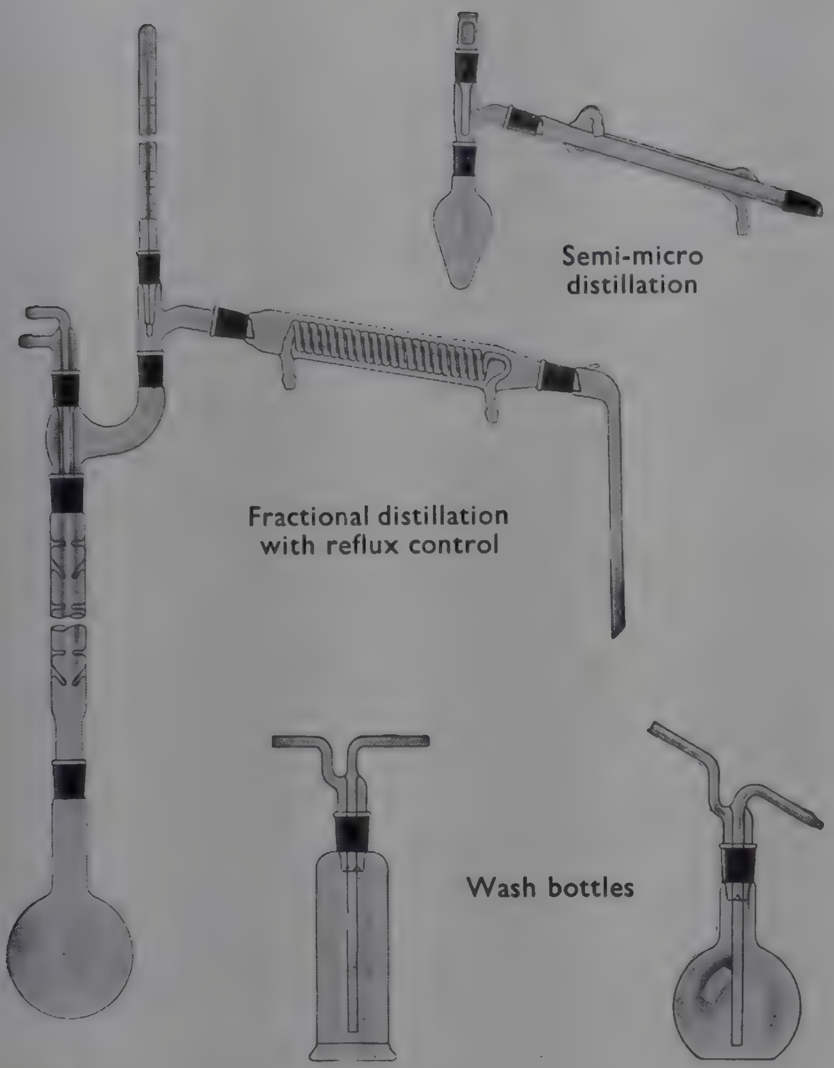

Distillation of a volatile product


Soluble gas absorption


Fractional distillation

QUICKFIT SETS

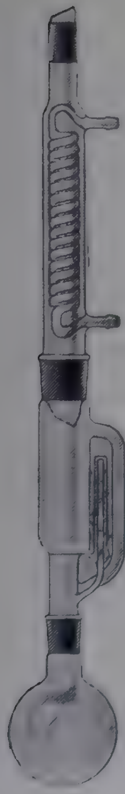
For Distillation and Preparative Chemistry



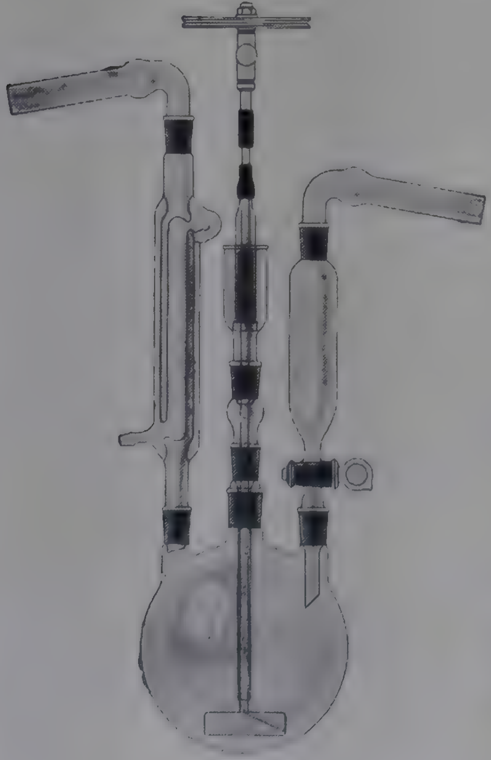
Semi-micro distillation

Fractional distillation with reflux control

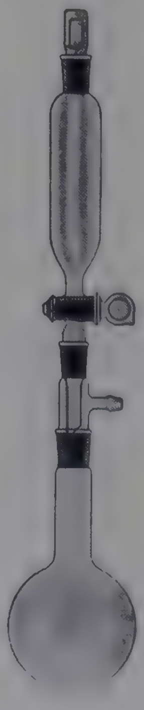
Wash bottles



Extraction



Reflux with stirring and addition of reactants



Gas evolution

STARTING AND INTERMEDIATE SETS

for quantities from 30 g to 1 kg

DT-800

QUICKFIT SET 34 BU. A starting set of 16 components which include the necessary equipment for a wide range of preparations up to 150 g scale. In box 48 × 38 × 11 cm with plastics storage tray. Each **£16·50** *jx*

DT-802

QUICKFIT SET 34 X. An extension set of 10 components which convert 34 BU (DT-800) into 33 BU (DT-804). In box 48 × 38 × 18 cm ... Each **£13·15** *jx*

DT-804

QUICKFIT SET 33 BU. Intermediate set of 26 components of wider scope than 34 BU (DT-800) up to 300 g scale and provides for stirring and steam distillation. In two boxes as detailed for DT-800 and DT-802. Each **£29·60** *jx*

DT-806

QUICKFIT SET 33 X. An extension set of 20 components which convert 33 BU (DT-804) into 32 BU (DT-808). In two boxes 46 × 38 × 11 cm and 46 × 38 × 18 cm respectively ... ... Each **£36·15** *jx*

DT-808

QUICKFIT SET 32 BU. Intermediate set of 46 components providing a comprehensive range of equipment for organic chemistry up to 1 kg scale. Includes 3 neck flasks, fractionating column, double surface condenser and ground sleeve stirrer. In four boxes as detailed for DT-804 and DT-806 ... ... Each **£65·85** *jx*

DT-810

QUICKFIT SET 32 X. An extension set of 53 components which convert 32 BU (DT-808) into 30 BU (DT-812). In five boxes, three of them 46 × 38 × 11 cm and two 38 × 23 × 7 cm ... ... Each **£75·20** *jx*

DT-812

QUICKFIT SET 30 BU. A comprehensive multi-joint set of 99 components with which a very wide range of organic reactions and preparations can be carried out on any scale from 30 g to 1 kg. In nine boxes as detailed for DT-800, DT-802, DT-806 and DT-810 ... Each **£139·05** *jx*

QUICKFIT SETS

For Distillation and Preparative Chemistry

14/23 ONE JOINT SETS

DT-830

QUICKFIT SET 29 BU. A basic set of 5 components with 14/23 joints designed for elementary organic chemistry in schools on a 30 g scale. In box 30 × 18 × 12 cm. Each **£4·80** *jx*

DT-834

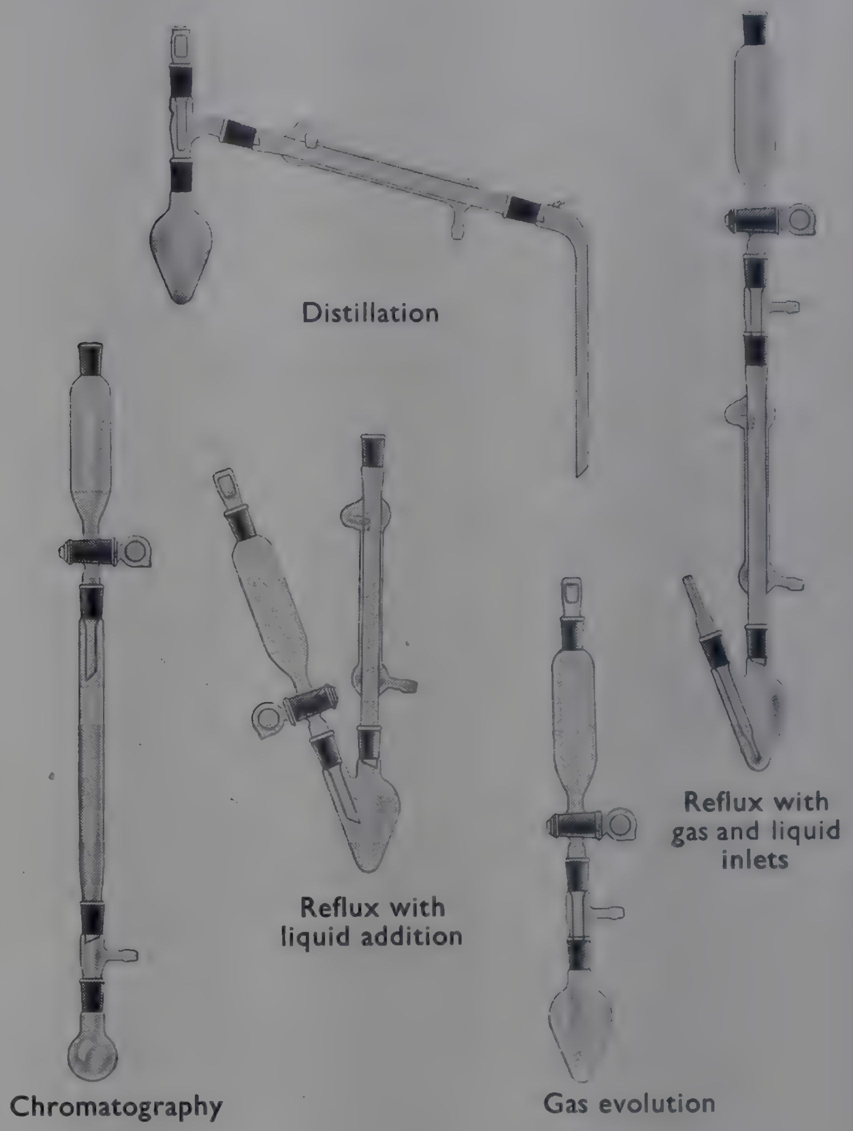
QUICKFIT SET 27 BU. An intermediate set of 8 components with 14/23 joints for student use. In box 38 × 23 × 7 cm ... ... Each **£8·65** *jx*

DT-836

QUICKFIT SET 27 X. An extension set of 8 components which convert 27 BU (DT-834) into 23 BU (DT-838). In box 38 × 23 × 7 cm ... Each **£6·40** *jx*

DT-838

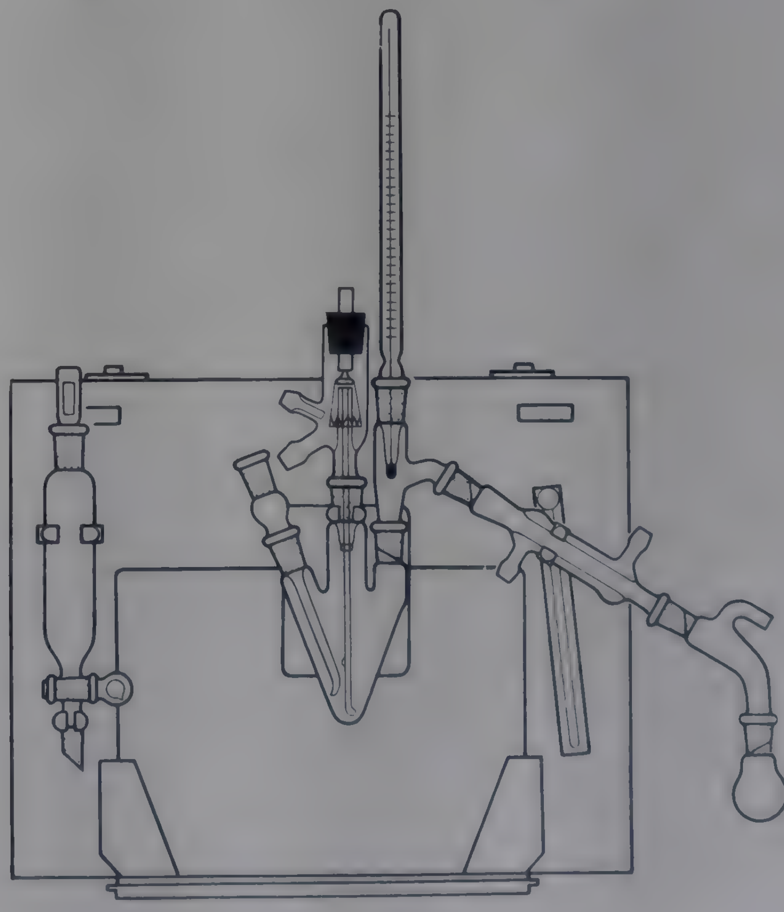
QUICKFIT SET 23 BU. An advanced students set of 15 components with 14/23 joints and a plastics drawing stencil. For small scale preparations up to 30 g scale. In two boxes each 38 × 23 × 7 cm ... Each **£15·05** *jx*


Distillation
Reflux with gas and liquid inlets
Reflux with liquid addition
Chromatography
Gas evolution

SEMI-MICRO LABORATORY

DT-870

QUICKFIT PORTABLE LABORATORY 10 BU. Comprising 22 components with 10/19 joints and a plastics drawing stencil in dual purpose box 28 × 23 × 7 cm. The lower part of the box serves for storage of components while the two-piece lid easily converts to a stand on which assemblies can be mounted in plastics coated spring clips. The working surface is plastics coated and a flame deflector is fitted. More than 25 assemblies can be used which will cover organic chemistry up to degree level for educational purposes ... ... Each **£31·35** *jx*

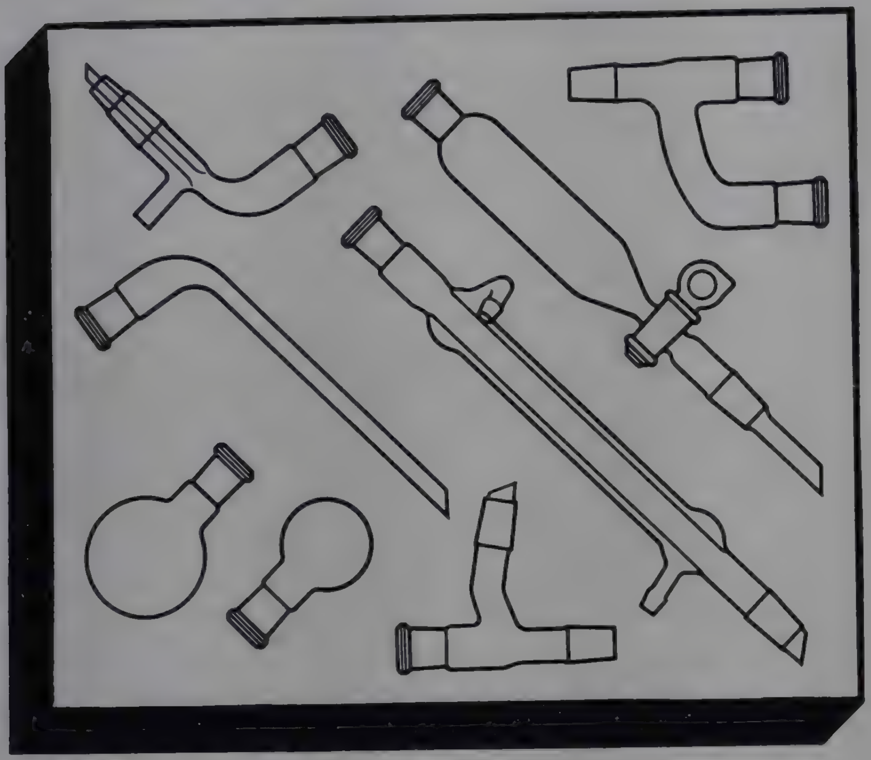


DT-870

CLEARFIT ONE JOINT SETS

Clearfit conical glass joints are manufactured by a process which achieves a fine precision fit without the necessity of grinding. This provides the following advantages:

- **Greater strength**
- **Reduced leakage and creep**
- **Less contamination, easier cleaning**
- **Greasing rarely necessary**
- **Reduced seizing or sticking**
- **Transparent for internal observation**
- **Interchangeable with ground joints**



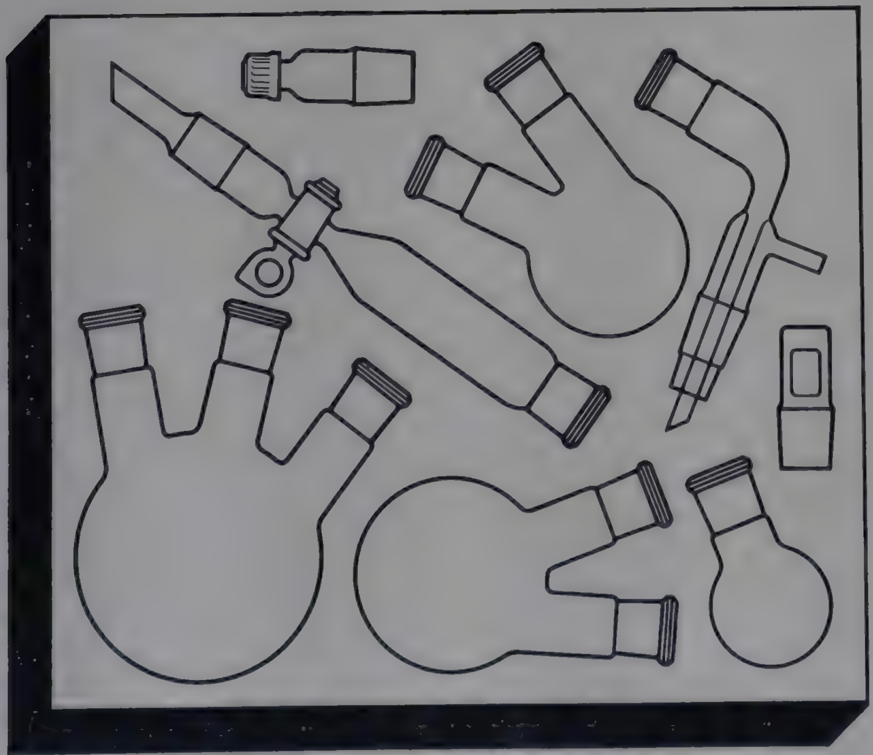
DT-900 (Box 1)

DT-900

CLEARFIT 19/26 ONE JOINT SET KA2/11 comprising components with 19/26 joints listed below, supplied in two storage boxes, each 47 × 39 × 13·5 cm fitted with moulded polystyrene trays. Total weight 3·5 kg.

Box 1		**Box 2**	
Q-KC1/12	Condenser.	Q-KFR250/2S/22A	Flask.
Q-KD1/22	Funnel.	Q-KFR500/2S/22A	Flask.
Q-KFR50/2S	Flask.	Q-KSB19	2 stoppers.
Q-KFR100/2S	Flask.	Q-KST52/13	2 adapters.
Q-KMA1/2	Adapter.	Q-KST20/2	Gland.
Q-KRA1/12	Adapter.	Q-MF5	Inlet tube.
Q-KRA3/22	Adapter.	Q-MU31/1	Thermometer.
Q-KSH4/2	Stillhead.	Q-MU31/2	Thermometer.
		Q-ST6/7	Stirrer.
		Q-ST7/2	Stirrer.

Each **£30·00** *jx*



DT-920 (Box 2)

DT-920

CLEARFIT 29/32 ONE JOINT SET KA4/11 comprising components with 29/32 joints listed below, supplied in two storage boxes, each 47 × 39 × 15·5 cm fitted with moulded polystyrene trays. Total weight 4·4 kg.

Box 1		**Box 2**	
Q-KC1/44/30	Condenser.	Q-KD1/2/44	Funnel.
Q-KMA1/44	Adapter.	Q-KFR100/4S	Flask.
Q-KRA1/14	Adapter.	Q-KFR250/4S/4A	Flask.
Q-KSB29	Stopper.	Q-KFR500/4S/4A	Flask.
Q-KSH4/4	Stillhead.	Q-KFR1L/4S/44A	Flask.
Q-KST2/44/7	Stirrer.	Q-KRA3/44	Adapter.
Q-KST54/18	Adapter.	Q-KSB29	Stopper.
Q-KST20/4/6	Gland.	Q-KST54/18	Adapter.
Q-ST6/7	Stirrer.		
Q-ST7/3	Stirrer.		

Each **£34·90** *jx*

SECTION INDEX

ELECTRICAL ACCESSORIES pages
Adapters, connectors, fuses, plugs, probes, terminals, wire, cable, etc. 193/194

ELECTRICAL CONTROLS
Energy regulators, relays, rheostats transformers, power supply units, etc. 195/199

ELECTRICAL INSTRUMENTS pages
Ammeters, galvanometers, multirange meters, oscilloscope, potentiometers, resistance boxes, resistance bridges, reference cells, recorders, voltmeters, etc. 200/205

Other useful items will be found under the following headings: Batteries, Heaters, Lubricants, Motors, Thermoregulators, Tools.

ACCESSORIES FOR MAINS ELECTRICITY SUPPLIES

EB-110
PLUG, 13A 3-pin to BS 1363 with integral fuse. Moulded plastics case ... ... Each **£0·36** *mx*

EB-124
FUSES, cartridge, to BS 1362, $1 \times \frac{1}{4}$ in dia. for plugs EB-110. Available ratings, 2, 5, 10 and 13A. In packs of 10 ... ... 10 packs **£4·00** Pack **£0·45** *mx*

When ordering please state fuse rating.

EB-110

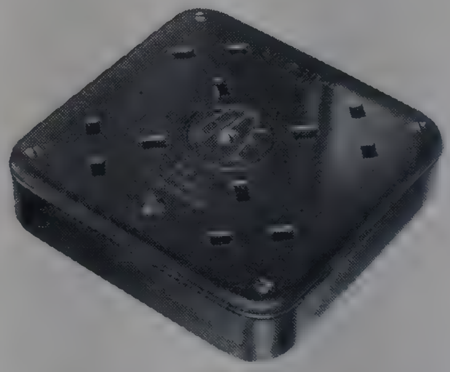
EB-130

EB-130
ADAPTER, 13A 3-pin, with twin 13A shuttered socket outlets. For plugs and sockets to BS 1363. Moulded bakelite case ... ... Each **£0·65** *mx*

EB-140
SOCKET, 13A 3-pin. Rubber clad ... Each **£0·55** *mx*

EB-145
MULTIPLE SOCKET OUTLET, with four 13A sockets to BS 1363 housed in a robust neoprene rubber case. Suitable for floor, bench or wall mounting. With integral indicator lamp ... ... Each **£5·00** *mx*

EB-140



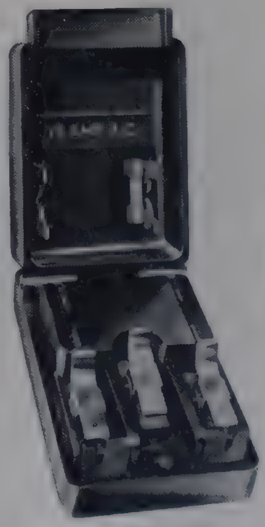
EB-145

EB-150
MULTIPLE SOCKET OUTLET, with five 13A sockets to BS 1363 housed in a rigid PVC and earthed aluminium case for standing on bench. The micro circuit breaker will withstand a momentary surge in excess of 60A but trips on extended overload before the 13A fuse blows. The indicator lamp shows when the circuit is live and the unit complies with IEE regulations ... ... Each **£7·25** *mx*

EB-150

EB-160
CONNECTOR, snap-action. A very useful device for making temporary connections of electrical apparatus to mains. The spring loaded terminals have a large contact area and provide a firm grip. They are colour coded, brown, green and blue. A double pole on/off switch with fuse EB-124 forms part of the cover and ensures that accidental contact with live terminals cannot be made when the cover is open ... Each **£2·60** *mx*

EB-165
TERMINAL STRIP, 5A, 12-way moulded flexible plastics. Can be cut into smaller units as required. Ten **£2·00** Each **£0·27** *mx*



EB-160

EB-165

continued overleaf

ACCESSORIES FOR MAINS ELECTRICITY SUPPLIES
(continued)

EB-180

EB-180

TEST PROD, with neon lamp, safety resistor and test prods. Will indicate polarity, leakage, short circuits in a.c. and d.c. circuits. Enclosed in plastics cover.
Ten **£4·30** Each **£0·48** *mx*

METRIC DIMENSIONS of BA and SWG sizes

Size	Dia. (mm)
0 BA	6·0
2 BA	4·7
4 BA	3·6
23 SWG	0·61
18 SWG	1·22
17 SWG	1·42
16 SWG	1·63

EB-220

EB-220

ELECTRICAL TERMINATIONS SET, *Ampliversal,* comprising 25 each of eight types of insulated wire connectors and terminations which may be quickly fitted to wire using the crimping tool provided.
The terminations include rings of 0 and 4 BA sizes, spades of 2 and 4 BA sizes, wire pins and push-on receptacles. These and the connectors are suitable for wires of up to 10 or 15 amperes capacity according to type. The tool is used for cutting, stripping and crimping. Packed in metal box with storage compartments ... Each **£7·75** *mx*

REPLACEMENT PARTS

EB-226	**Butt connectors,** for wires of 23 to 17 SWG.	Pack of 50	**£1·60** *mx*
EB-227	**Butt connectors,** for wire of 18 to 16 SWG.	Pack of 50	**£1·60** *mx*
EB-231	**Push-on receptacles** to fit ¼ in wide blades, for wires of 23 to 17 SWG	Pack of 50	**£2·50** *mx*
EB-235	**Rings,** 0 BA, for wires 18 to 16 SWG.	Pack of 50	**£1·65** *mx*
EB-236	**Rings,** 4 BA, for wires 18 to 16 SWG.	Pack of 50	**£1·40** *mx*
EB-241	**Spades,** 2 BA, for wires 23 to 17 SWG.	Pack of 50	**£1·40** *mx*
EB-242	**Spades,** 4 BA, for wires 23 to 17 SWG.	Pack of 50	**£1·40** *mx*
EB-247	**Pins,** for wires 23 to 17 SWG ...	Pack of 50	**£1·35** *mx*

EB-300

CABLES, 3-core, flexible, rubber insulated with tough rubber outer sheath. Core insulations coloured brown, blue and green/yellow.

Current rating	3	6	13A	
Wire specification	16/0·2	24/0·2	30/0·25 mm	
10 metres	**£0·90**	**1·35**	**1·50**	*cx*
Metre	**£0·16**	**0·20**	**0·22**	

GENERAL PURPOSE ACCESSORIES

EB-335

EB-335

PLUGS, banana, 4 mm, stackable.

Red	Each	**£0·30**	*cx*
Blue	Each	**£0·30**	*cx*

EB-342

***EB-342**

TEST PROBES, flexible with press-button operated retractable ends which may be clipped firmly to wires or tags under test. With socket for 4 mm banana plug, and grub screw fixing for lead. Length 100 mm.

Red	Each	**£0·77**	*fx*
Black	Each	**£0·77**	*fx*

EB-500

WIRE, tinned copper, uninsulated. On reel of approx. 35 metres. Diameter 0·9 mm (20 SWG) Reel **£0·85** *cx*

EB-502

SLEEVING, PVC, insulation for EB-500, bore 2 mm. On reel of approx. 100 metres ... ... Reel **£1·65** *cx*

EB-510

WIRE, 3A rating, single core 16 strand/0·2 mm, PVC insulated. On reel of approx. 100 metres.
Reel **£3·00** *cx*

EB-512

WIRE, 13A rating, single core 30 strand/0·25 mm, PVC insulated. On reel of approx. 100 metres.
Reel **£6·40** *cx*

TT-560

WIRE CUTTER STRIPPER. For details and price see entry in List No. sequence.

Example of use of shrink sleeving EB-520

EB-520

HEAT SHRINKABLE SLEEVING, for insulation and identification of wires and for forming protective sleeves over glass to wire junctions such as on resistance thermometers, electrodes, etc. The irradiated polyolefine sleeve quickly shrinks, when heated to about 100°C, by up to 50% of its supplied diameter to take up the shape of the object it encloses. Maximum working temperature 105°C.

Int. dia.	3	6·5	9·5	13 mm	
Int. dia. shrunk	1·5	3·2	5·0	6·5 mm	
Wall	0·5	0·6	0·8	0·8 mm	
10 metres	**£0·55**	**0·65**	**1·05**	**1·25**	*cx*
Metre	**£0·13**	**0·14**	**0·18**	**0·20**	

POWER CONTROLLERS

FOR CONTROLLING SMALL FURNACES, HOTPLATES, WATER BATHS, etc.

For controlling power input by periodically and automatically switching on and off the electrical supply. The ratio of 'on' time to total cycle time determines the average input and is infinitely variable. Because of their small size, continuously variable adjustment and freedom from power loss, these energy regulators can, to advantage, replace three-heat switches and resistance controls on most forms of heating equipment.

OPERATION

The regulator is essentially a single-pole switch having one contact mounted on a bimetal strip wound with a heater. When the switch is closed, current flows through the heater. The bimetal increases in temperature and opens the switch, thus breaking the supply to the heater. When the bimetal cools the cycle is repeated. The ratio of the 'on' to the total time and thus the average input is controlled by a cam operated by the control knob.

CHARACTERISTICS

Continuous and maximum current ratings are given for each regulator. The continuous rating applies when the apparatus is normally required to run for long periods. The maximum rating should be used only when the apparatus is to be used for periods of one or two hours per day. **For d.c. supplies the regulator contacts will only switch 0·1A and so they must always be used with a relay such as EC-980 or ED-101.**

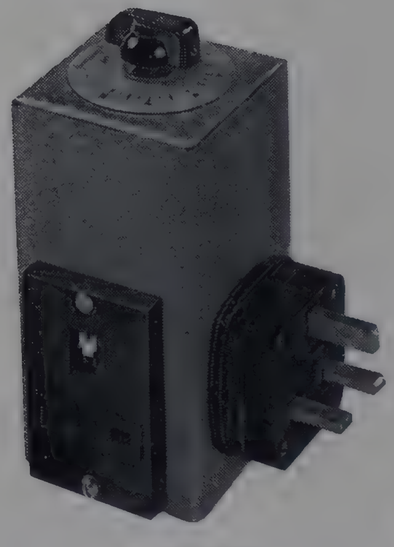
Energy regulators provide automatic compensation for changes in the supply line voltage but do not compensate for changes in ambient temperature.

The controllers listed below are all fitted with **non-linear regulators** which are suitable for controlling heating apparatus e.g. furnaces, which, in order to have a high heating rate, have higher power heaters than are required to maintain the maximum temperature. 50% power setting is at a scale reading of about 90.

EC-760

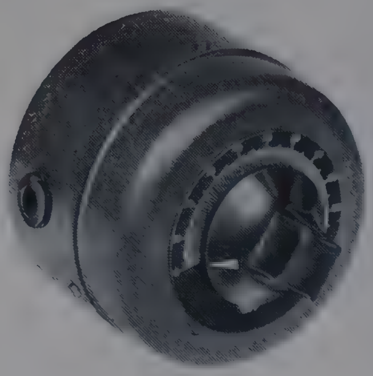
POWER CONTROLLER, *Gallenkamp*, **with 3-pin plug and socket.** In stove enamelled steel case fitted with a 13A 3-pin socket outlet to BS 1363 and a 13A 3-pin plug connection for the apparatus to be controlled. With arbitrary scale 0–100 and replaceable 13A fuse. Current rating 6A continuous, 12A maximum intermittent. For 200/250V a.c. single phase supplies ... Each **£11·00** *bx*

EB-124 **Fuse,** 13A cartridge for above. For price see entry in List No. sequence.


EC-760

EC-810

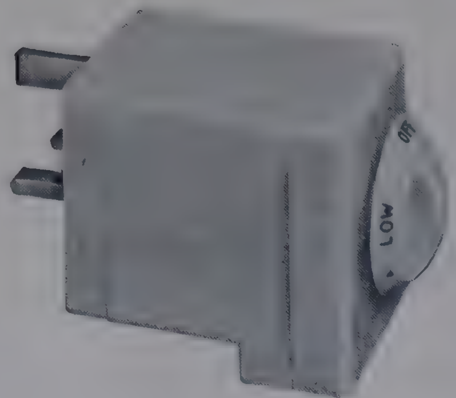
POWER CONTROLLER, for in-line connection. In metal case with arbitrary scale 0–100. Current rating 4A continuous, 11A maximum intermittent. For 200/250V a.c. single phase supplies. **Supplied without leads** ... ... Each **£3·20** *fx*


EC-810

EC-845

POWER CONTROLLER, with 3-pin input plug. In plastics case which forms an integral part of a 3-pin 13A plug to BS 1363. With arbitrary scale 0–5, replaceable 13A fuse and terminals for cable outlet connection. Current rating 4A continuous, 11A maximum intermittent. For 200/250V a.c. single phase supplies. Each **£3·20** *cx*

EB-124 **Fuse,** 13A cartridge for above. For price see entry in List No. sequence.



EC-845

Thermoregulators, Contact thermometers and **Thermostat** for thermostatic control of temperature—see TM-450 et seq. in List No. sequence.

Gallenkamp TRANSISTORISED RELAY

REGD TRADE MARK

For use with contact thermometers and other thermostatic devices to switch heavy heater loads and for many other laboratory applications.

- **Switches loads up to 20A at 250V (5 kVA)**
- **Incorporates double pole changeover switch**
- **For 'normally open' and 'normally closed' switching**
- **Self-powered, intrinsically safe control circuit**
- **Earthed or floating control circuit operation**
- **Built-in mains and load lamp indicators**

MAINS
LOAD
Gallenkamp

EC-980

The *Gallenkamp* transistorised relay is an interface module to convert a low current, low voltage switch into a heavy duty power switch. The incorporated independent double pole changeover switch **makes the relay unusually versatile for its size and price.** It can switch two circuits or two sides of the same circuit in either the 'normally open' mode or the 'normally closed'. Moreover, by suitable wiring, it can switch the mains by which it is powered on and off in another circuit, or it can be used to switch an independent a.c. or d.c. electricity supply into the circuit.

The control circuit (e.g. to the contact thermometer) is intrinsically safe, operating on very low voltage and current; it is also self-powered. The control circuit can be operated either earthed or floating simply by the inclusion or removal of an internal connecting link.

TECHNICAL DATA

Power contacts — Double pole changeover rated at 20A 250V a.c. non-inductive and 1A 220V d.c.

Control circuit — 15V d.c. open circuit applied to the control device with a resulting current of 4 mA.
— Earthed or floating circuit.
— Self-powered.
— 250V max. between control circuit and earth.

Operational mode — normally open or normally closed.

Ambient temperature — Up to 50°C.

Dimensions — H W D 19×11·5×7·5 cm

EC-980

TRANSISTORISED RELAY, *Gallenkamp*, as specification. Enclosed in die-cast light alloy box suitable for wall or bench mounting. Fitted with indicator lamps and terminal block for load and mains supplies. A 2-pin plug connector is supplied for attachment to the leads of the control device (e.g. contact thermometer). Includes instructions manual well illustrated with examples of typical circuit applications. **Without mains or load circuit cables.** For 110/120V and 200/250V a.c. single phase supplies ... ... Each **£21·50** *bx*

HOTWIRE VACUUM RELAYS

The relays listed are operated by the thermal expansion of a wire through which the control current passes. The period of 2 or 3 seconds which the wire takes to heat or cool causes a delay in the operation of the contacts thus preventing 'chattering'. Surge suppressors are fitted as standard.

Hotwire relay switches are suitable for thermostats such as the bimetallic type with 'normally closed' contacts and for liquid expansion thermoregulators and contact thermometers with 'normally open' contacts. The HVR is for use with either, whereas the HVS 103/3M is for use only with 'normally closed' and the HVS 103/4M only with 'normally open' contacts. Most contact thermometers, however, are better used with electronic relays such as EC-980.

ED-101

RELAY, HOT WIRE VACUUM, Type HVR, **normally closed or open,** as specification, suitable for controlling loads up to 1·2 kVA on 100/130V and 2·0 kVA on 200/250V supplies.
For 200/250V a.c. single phase supplies... Each **£9·20** *fx*
For 100/130V a.c. single phase supplies... Each **£9·50** *fxN*

When ordering please state voltage and frequency of supply.

ED-104

RELAY, HOT WIRE VACUUM, Type HVS 103/3M, **normally closed,** as specification, suitable for controlling loads up to 2·0 kVA on 100/110V and 3·5 kVA on 200/250V supplies.
For 240/250V a.c. single phase supplies... Each **£11·90** *fxN*
For 100/110, 200/210 or 220/230V a.c. single phase supplies. Each **£11·90** *fxN*

ED-106

RELAY, HOT WIRE VACUUM, Type HVS 103/4M, **normally open,** as specification, suitable for controlling loads up to 2·0 kVA on 100/110V and 3·5 kVA on 200/250V supplies.
For 240/250V a.c. single phase supplies... Each **£12·60** *fxN*
For 100/110, 200/210 or 220/230V a.c. single phase supplies. Each **£12·60** *fxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

ED-110	**Relay tube,** type 602, for ED-101 ...	Each	**£4·85**	*fx*
ED-112	**Relay tube,** type 603, for ED-104 or ED-106.	Each	**£6·30**	*fx*

SLIDING RESISTORS

(RHEOSTATS)

A range of ruggedly constructed tubular resistors, using diecast end plates and solid drawn steel tubes with steel tie rods. Light weight construction and good ventilation give rapid temperature stabilisation.

The insulated terminals accept either 4 mm plugs, spade type connectors, or wires.

NOTE: Wherever voltages in excess of 100V are applied, **enclosed types** ED-320 to ED-324 should be used for safety.

ED-300 to ED-306

SLIDING RESISTORS—OPEN TYPE

for use with safe low voltage.

List No.	Max. amps	Resistance ohms	Tube size cm	Each	
				£	
ED-300	10	2·8	25×3	**5·50**	mx
		5·7	30×5	**7·70**	mx
		11	45×6	**11·00**	mx
ED-302	5	11·6	25×3	**5·10**	mx
		23	30×5	**6·40**	mx
		45	45×6	**9·50**	mx
ED-304	2	56	25×3	**5·10**	mx
		113	30×5	**6·40**	mx
		215	45×6	**9·50**	mx
ED-306	1	265	25×3	**5·10**	mx
		535	30×5	**6·40**	mx
		1040	45×6	**9·50**	mx

ED-320 to ED-324

SLIDING RESISTORS—ENCLOSED TYPE

for use with mains voltage.

List No.	Max. amps	Resistance ohms	Tube size cm	Each	
				£	
ED-320	2	56	25×3	**6·80**	mx
		113	30×5	**8·80**	mx
		215	45×6	**12·50**	mx
ED-322	1	265	25×3	**6·80**	mx
		535	30×5	**8·80**	mx
		1040	45×6	**12·50**	mx
ED-324	0·45	765	25×3	**6·80**	mx
		1500	30×5	**8·80**	mx
		2950	45×6	**12·50**	mx

RESISTANCE BOXES:

3, 4 and 5 decade
see EF-425 to EF-437

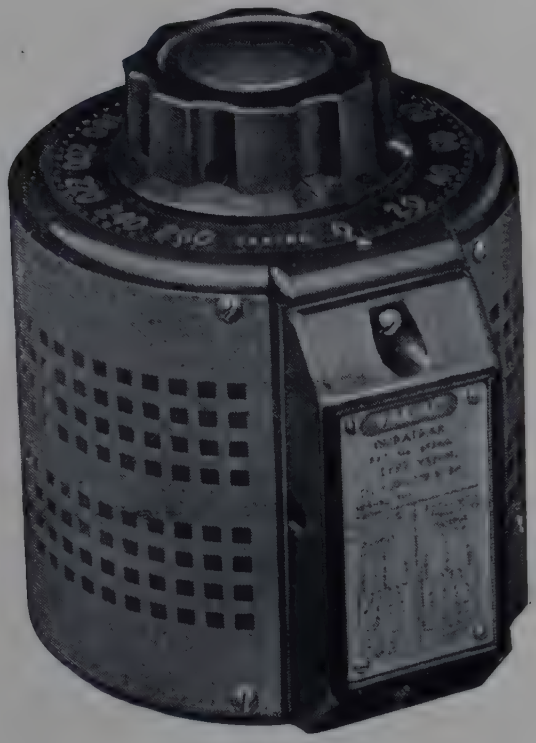
RESISTANCE BRIDGES:

General purpose and Wheatstone
see EF-370 and EF-380

For details and prices see entries in List No. sequence.

VARIABLE OUTPUT TRANSFORMERS

Variac variable output autotransformers provide smooth, stepless control over the output range, with indication of setting on the calibrated scales.



ED-602

ED-660

TECHNICAL DATA

Input voltages

The standard input is 240V 50/60 Hz single phase but all models have centre-tapped primaries for use on 120V 50/60 Hz supplies.

NOTE: When wired for use on 120V supplies, the current drawn **must not exceed half the rated current.**

Output voltages

Line-voltage connection. When the mains supply is connected across the whole primary winding, the output is variable from zero to mains voltage, i.e. 0 to 240V.

Over-voltage connection. When the mains supply is connected across only part of the primary winding by means of the tapping provided, the output is variable from zero to higher than mains voltage, i.e. 0 to 270V on 240V supplies.

Output currents

The rated and maximum currents shown in the table below are values calculated to protect the transformers by ensuring that winding temperatures do not exceed 55°C under continuous operation in ambient temperatures not exceeding 45°C.

Rated currents can be safely drawn from the transformer at any voltage setting.

Maximum currents can only be safely drawn at near-zero and near-maximum output voltage settings. Special care must therefore be taken with variable impedance loads (e.g. electric motors) and the output current checked when the voltage setting is increased or decreased. Less care is needed with constant impedance loads.

NOTE: When the over-voltage connection is used on the primary winding, the load **must never draw more than the rated current.**

BENCH MOUNTING

TRANSFORMERS, *Variac*, bench mounting, in ventilated case fitted with shrouded terminals.

List No.	Type No.	Rated current (amps)	Maximum current (amps)	Each	
				£	
ED-600	V3H-M	1·5	1·5	**9·20**	*fx*
ED-601	V5H-M	2·5	2·5	**10·55**	*fx*
ED-602	V6H-M	3	3·75	**12·70**	*fx*
ED-604	Y16H-M	8	8·0	**22·20**	*fx*
ED-606	V30H-M	15	15·0	**36·80**	*fxN*
ED-608	50B-M	25	25·0	**62·70**	*fxN*

PORTABLE

With carrying handle, mains switch, cartridge fuse and 2 metres mains 3-core input cable. Fitted with 13A 3-pin output socket to BS 1363. Supplied in over-voltage connection. Input 240V 50 Hz single phase; output 0 to 270V at rated current of 3A maximum.

ED-660

TRANSFORMER, *Variac*, **portable** Type No. V6H-PS, as specification ... ... Each **£17·90** *fxN*

ED-662

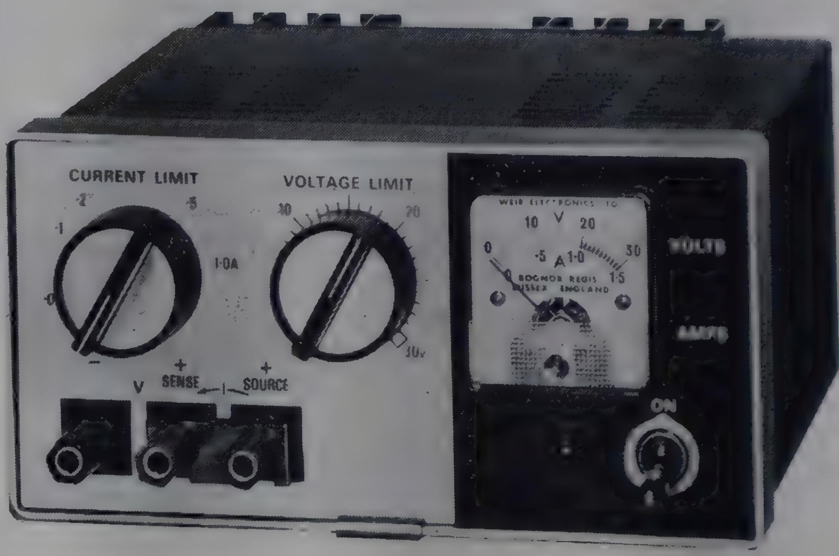
TRANSFORMER, *Variac*, **portable** Type No. V6H-PSV, as ED-660 but **with fitted voltmeter** for accurate reading of output voltage ... ... Each **£23·70** *fxN*

LOW VOLTAGE SUPPLY UNITS

ED-910

LOW VOLTAGE SUPPLY UNIT, solid state stabilised, 1·2A max., 30V max. d.c. smoothed output. For use as a supply for transistorised equipment or in place of batteries. Current and voltage continuously adjustable by calibrated limit setting controls. Output is d.c. with ripple less than 400 μV peak-to-peak. Voltage calibration accuracy 2%. Temperature coefficient: −(3 mV+0·02%) per degC. Internal impedance: less than 10 milliohms at 1 kHz. With continuous current short circuit protection device.

External binding posts permit the use of the unit as a current regulator, pulsed voltage regulator, temperature regulator or power amplifier. Dimensions 19×9×17 cm, net weight 2·5 kg. For 220/240V 50/60 Hz supplies.
Each **£50·00** *mx*



ED-910

ED-930

LOW VOLTAGE SUPPLY UNIT, 12A max., voltage continuously adjustable from 0 to 25V a.c. or unsmoothed d.c. For wall mounting, intended for use in laboratories requiring multiple outlets to replace accumulators or wet cells.

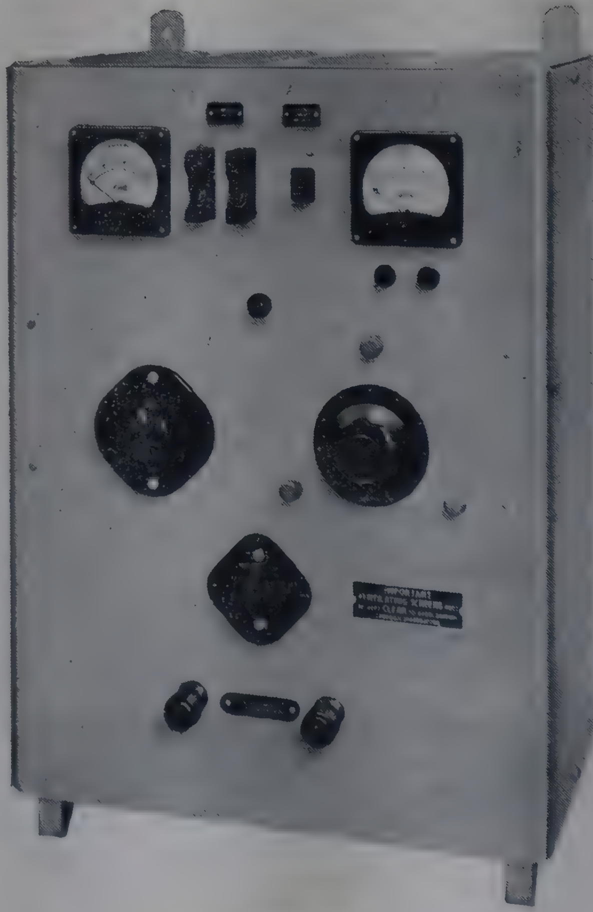
Includes moving iron ammeter and voltmeter, mains fuses and magnetic circuit breaker in the output circuit. The main transformer is double wound and vacuum impregnated and output control is provided by a toroidally wound adjustable autotransformer. D.C. output is derived from a full wave selenium rectifier bridge. With terminals for permanent and temporary output connections. Dimensions 43×28×41 cm high. Net weight 27 kg. For 200/250V 50 Hz single phase supplies.
Each **£88·00** *mxN*

ED-932

LOW VOLTAGE SUPPLY UNIT, as ED-930 but **24A max.** Dimensions 51×37×78 cm high. Net weight 55 kg ... ... Each **£136·00** *mxN*

ED-934

LOW VOLTAGE SUPPLY UNIT, as ED-930 but **48A max.** Dimensions 51×38×78 cm high. Net weight 73 kg ... ... Each **£203·00** *mxN*



ED-932

Gallenkamp

LOW VOLTAGE SUPPLY UNIT

With three circuits each having an output of 7A d.c. at 12V see EJ-095 in List No. sequence.

BATTERIES

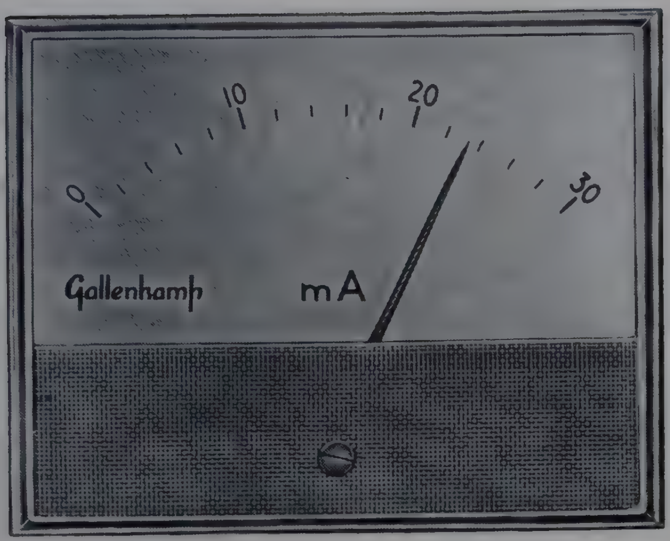
Single 2V cells in glass containers
see BJ-160 to BJ-166 in List No. sequence.

Voltage reference cell 1·35V
see EF-490 in List No. sequence.

MOVING COIL METERS

A range of high quality moving coil meters. Accuracy ±1% on d.c., ±2% on a.c. instruments. With 95 mm scales and lance type pointer for accurate readings.

Overall dimensions are 120×97 mm and a circular cut-out of 67·5 mm dia. is required for panel mounting.



EE-534

D.C. INSTRUMENTS

EE-514

MICROAMMETERS, d.c., moving coil, as specification.

Range 0 to	25	50	100 μA	
Resistance, approx.	3000	1300	1000 ohms	
Each	**£14·00**	**12·00**	**11·75**	cx

EE-534

MILLIAMMETERS, d.c., moving coil, as specification.

Range 0 to	1	3	10	30	100 mA	
Each	**£10·25**	**10·25**	**10·25**	**11·00**	**11·00**	cx

EE-554

AMMETERS, d.c., moving coil, as specification.

Range 0 to	1	3	10	30A	
Each	**£11·00**	**11·00**	**11·00**	**11·00**	cx

EE-574

MILLIVOLTMETERS, d.c., moving coil, as specification.

Range 0 to	10	100 mV	
Each	**£14·50**	**11·00**	cx

EE-594

VOLTMETERS, d.c., moving coil, as specification. Sensitivity 1000 ohms/V.

Range 0 to	1	3	10	30	100V	
Each	**£10·50**	**10·50**	**10·50**	**10·50**	**10·50**	cx

A.C. INSTRUMENTS

EE-604

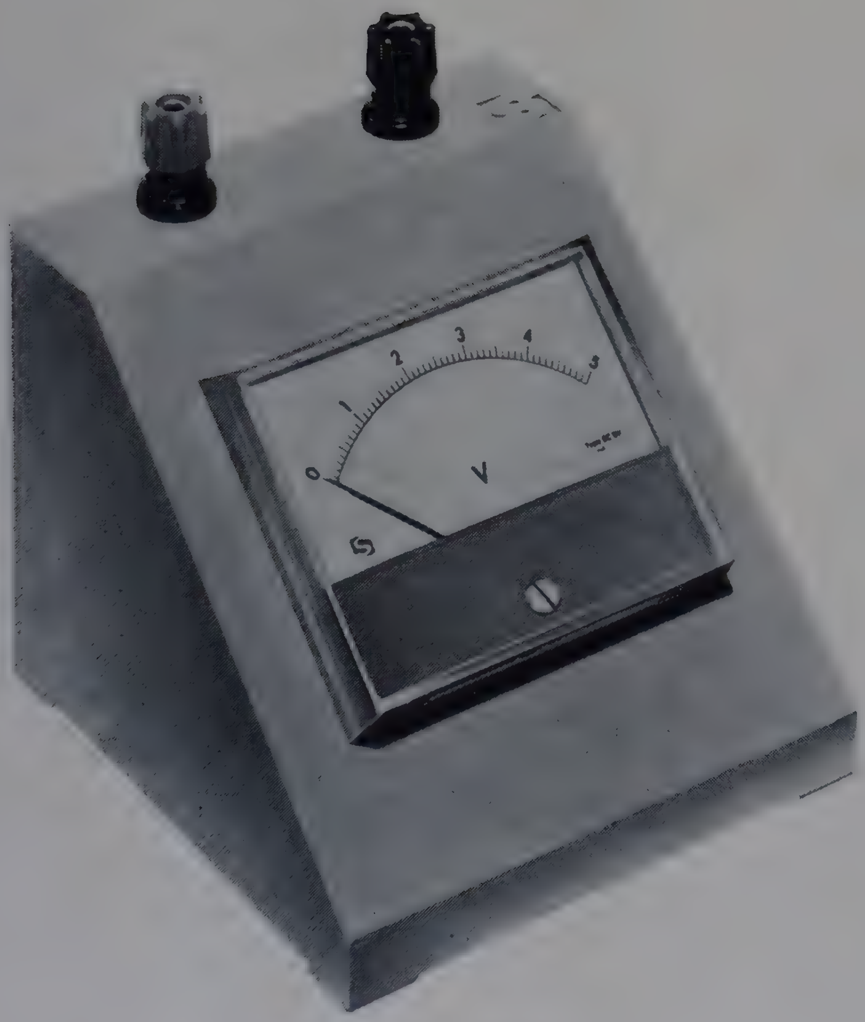
AMMETERS, a.c., moving coil, as specification, with rectifier and external current transformers suitable for use on mains frequencies.

Range 0 to	5	10	30A	
Each	**£20·50**	**20·50**	**26·00**	cx

EE-624

VOLTMETERS, a.c., moving coil, as specification, with rectifier. Sensitivity 1000 ohms/V.

Range 0 to	30	300V	
Each	**£13·50**	**13·50**	cx



EE-645 with meter

BENCH STAND

EE-645

BENCH STAND for EE-514 to EE-624. With sloping front, top terminals and interior leads... Each **£2·80** cx

MULTIRANGE METERS

Self-contained, portable, multirange a.c./d.c. measuring instruments.

COMPARISON OF MODELS

	Model 7††	Model 40††	Model 8	Model 9
Sensitivity	500 Ω/V	166 Ω/V	20 kΩ/V†	20 kΩ/V†
No. of ranges	47	40	30	30
d.c. voltages	50 mV to 1 kV	60 mV to 1200V	2·5 to 2500V	3 to 3000V
a.c. voltages	5V to 1 kV	6V to 1200V	2·5 to 2500V	3 to 3000V
d.c. currents	1 mA to 10A	6 mA to 12A	50 μA to 10A	50 μA to 10A
a.c. currents	5 mA to 10A	6 mA to 12A	100 mA to 10A	10 mA to 10A
Resistances (battery)	10 kΩ to 1 MΩ	1 kΩ to 100 kΩ	2 kΩ to 20 MΩ	2 kΩ to 20 MΩ
Resistances (mains)	10 MΩ to 40 MΩ	1 MΩ	200 MΩ	200 MΩ
Capacitance	20 μF	—	—	—
Decibels	−25 to +16	—	—	—

† On all d.c. ranges: 1 kΩ/V on a.c. above 10V on Model 8; 2 kΩ/V on a.c. above 10V on Model 9.
†† Incorporate facility for halving all current and voltage ranges.

EE-800
MULTIRANGE METER, *Avo* **Model 7,** specification as table. Supplied with leads, clips and instructions.
Each **£41·35** *fx*

EE-805
MULTIRANGE METER, *Avo* **Model 7X,** as EE-800 but tropicalised ... ... Each **£50·60** *fx*

EE-820
MULTIRANGE METER, *Avo* **Model 40,** specification as table. Supplied with leads, clips and instructions.
Each **£41·35** *fx*

EE-840
MULTIRANGE METER, *Avo* **Model 8,** specification as table. Supplied with leads, clips and instructions.
Each **£44·35** *fx*

EE-845
MULTIRANGE METER, *Avo* **Model 8X,** as EE-840 but tropicalised ... ... Each **£50·60** *fx*

ACCESSORY
EE-850 **Carrying case** for EE-800 to EE-845 ... Each **£8·18** *fx*

EE-800
(EE-820, EE-840 and EE-860 are similar)

EE-860
MULTIRANGE METER, *Avo* **Model 9,** specification as table. All range switches, controls and terminals are identified with graphical symbols which in general follow the requirements of the International Electrochemical Commission. Supplied with leads, clips and instructions.
Each **£44·35** *fx*

EE-870
MULTIRANGE METER *Avo* **Multiminor.** A pocket meter with 7 cm scale. Sensitivity 10 kΩ/V on d.c. and 1 kΩ/V on a.c. ranges. Twelve voltage ranges cover 100 mV to 1 kV d.c. and 10V to 1 kV a.c. Five current ranges are 100 μA to 1A d.c. and two resistance ranges are 20 kΩ and 2 MΩ. Dimensions 20×10×4 cm, weight 0·7 kg. Supplied with leads, clips and instructions in plastics case ... ... Each **£14·70** *fx*

EE-870

GALVANOMETERS

ELECTRONIC GALVANOMETER

An electrically and mechanically robust, compact electronic galvanometer with pivot needle meter readout. Incorporates calibrated 0 to 1 and 0–10 mV voltage and 0 to 1 and 0 to 10 μA ranges with incremental sensitivity control. Zero adjustment is by a single simple control and no levelling is required. The instrument is built around a battery operated d.c. amplifier, input impedance 1000 Ω which is stable in use and results in very rapid response compared with ordinary suspension optical galvanometers. The amplifier is self-protecting on overloads up to 25V or more for short periods. Used with series resistors the galvanometer is equivalent to an electronic voltmeter and it can be used with thermocouples for temperature measurement. An output socket provides analogue outputs up to 5 mA at 6V with an output impedance of 600Ω Powered by two PP9 batteries.

Dimensions 159×102×130 mm high.

EF-180

GALVANOMETER, *JAY-JAY*, as specification, including two PP9 batteries but **without external resistors or thermocouples** ... ... Each **£27·50** *fx*

OUTPUT
SENSITIVITY
MAX
MIN
ZERO
INPUT

EF-180

SCALAMP
TAUT SUSPENSION GALVANOMETER

A taut suspension movement is mounted in a moulded plastics case together with a shunt, a lamp and a transformer for mains operation A 15 cm scale with side and central zero is fitted to the front of the case.

Each galvanometer has a slow motion set-zero control knob. The shunt is of the constant damping, constant current Ayrton-Mather type with 6 positions giving a 1 to 1000 range of sensitivities. A shorting switch incorporated in one foot ensures the coil is short circuited and thus damped when the instrument is lifted. Diode and fuse protection of movement are provided.

Dimensions 20×28×18 cm.

For 200/250V or 110V 50/60 Hz single phase supplies.

When ordering please state voltage and frequency of supply

List No.	**EF-200**	**EF-203**
Coil resistance (ohms)	24	1400
Period (seconds)	2	2
Critical damping resistance (ohms)	230	25,000
Sensitivity × 1 range (mm/μA)	17	190
(μA/mm)	0·056	0·0053
Each	**£41·00**	**£41·00**

fxN

EF-200
EF-203

RESISTANCE BRIDGES

EF-370

D.C. RESISTANCE BRIDGE, miniature, general purpose, range 0 to 1·10 MΩ in five ranges (×1/100, ×1/10, ×1, ×10, ×100), accuracy about ±2% ±1 scale division. Incorporates stabilised resistance coils and a high gain solid state amplifier in the null detector circuit for good discrimination. Self-protected against overloads from severe out-of-balance conditions. Novel design of the two dials gives 'in line form' reading. Supplied with two PP9 batteries. Dimensions 160×130×105 mm high. Each **£39·90** *fx*

EF-380

WHEATSTONE BRIDGE, range 0 to 1·111 MΩ, accuracy about 0·5% or better. Comprises three pairs of non-inductive ratio arms, and a 4-decade variable balancing resistor with a sensitive null point galvanometer self-protected against out-of-balance overloads. The case has a transparent base for viewing internal components. The galvanometer may be disconnected and replaced by an oscilloscope for a.c. bridge measurements of inductance and capacitance. Dimensions 310×260×155 mm high. **Requires but does not include a 4½V battery** ... ... Each **£49·50** *fx*

CL-924 **Battery,** 4½V. For details and price see entry in List No. sequence.

DECADE RESISTANCE BOXES

All decade resistors are aged to stabilise their resistance and, together with switches, terminals and internal wiring, are designed to reduce self-inductance and capacitance to a minimum so that the boxes can be used at up to 'radio frequencies' without introducing appreciable error. Each decade is clearly marked on the control panel with the maximum current which it can safely carry. The stove enamelled steel outer case provides electrostatic and electromagnetic screening. Terminals are 4 mm socket type.

EF-425

RESISTANCE BOX, 3-decade, as specification, with decades in steps of units, tens and hundreds to a total of 1110 ohms. Accuracy about 0·4%. Dimensions 260×85×90 mm high ... ... Each **£9·90** *fx*

EF-427

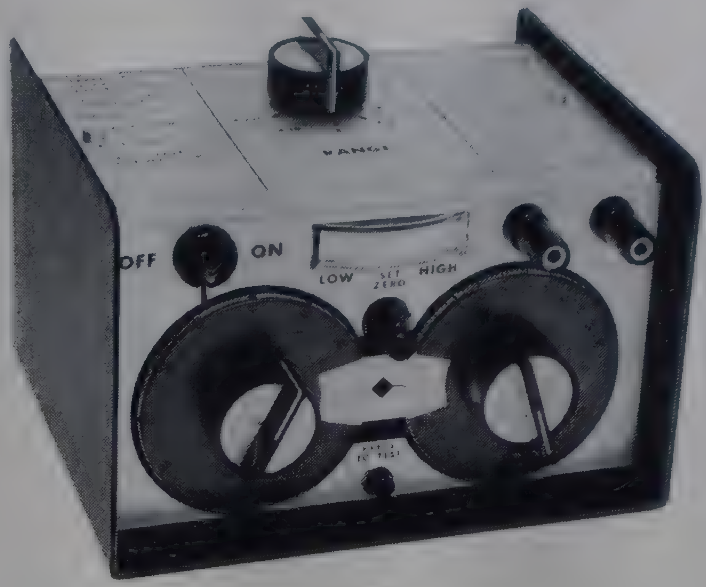
RESISTANCE BOX, 3-decade, as specification with decades in steps of tens, hundreds and thousands to a total of 11,100 ohms. Accuracy about 0·4%. Dimensions 260×85×90 mm high ... ... Each **£9·95** *fx*

EF-435

RESISTANCE BOX, 4-decade, as specification, with decades in steps of tenths, units, tens and hundreds to a total of 1111 ohms. Accuracy about 0·1% except tenths and units decades. Dimensions 340×105×95 mm high. Each **£25·00** *fx*

EF-437

RESISTANCE BOX, 5-decade, as specification, with decades in steps of tenths, units, tens, hundreds and thousands to a total of 11,111 ohms. Accuracy about 0·1% except tenths and units decades. Dimensions 410×105×95 mm high ... ... Each **£30·25** *fx*

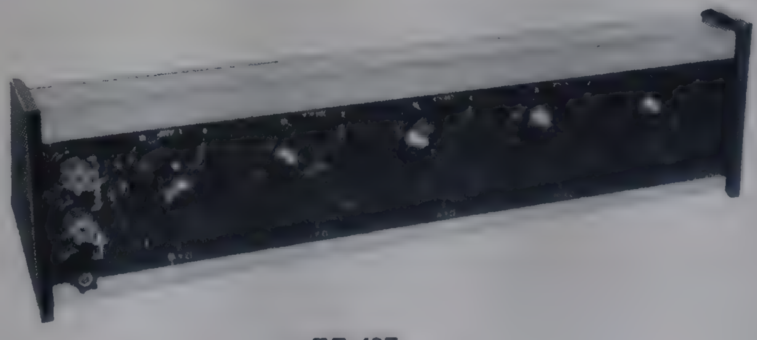


EF-370

EF-380

RESISTANCE IN OHMS
Ωx1000
Ωx100
Ωx10
JUNIOR

EF-427
(EF-425 is similar)



EF-437
(EF-435 is similar)

STANDARD CELLS

EF-475

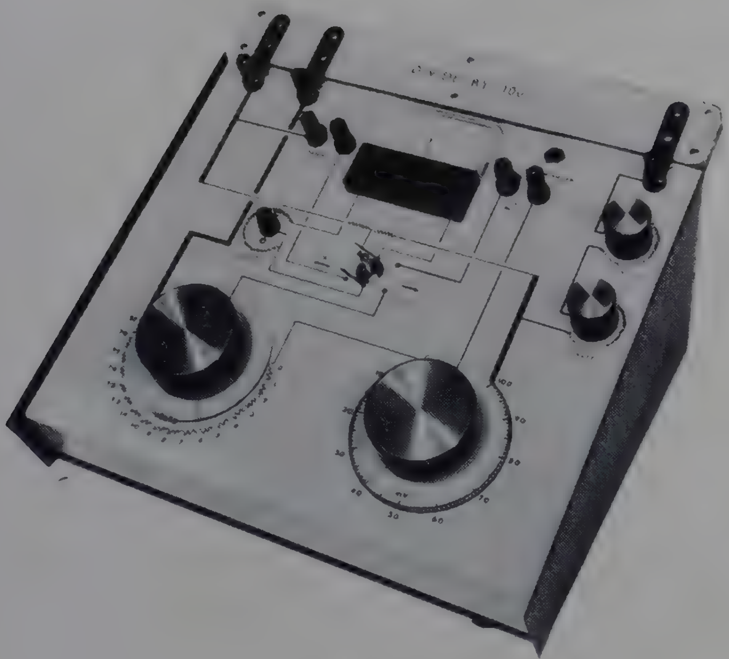
STANDARD WESTON CADMIUM CELL. A saturated type H cell producing e.m.f. of 1·0186V at 20°C with temperature coefficient −40 μV per degC rise between 15° and 25°C. In case 4·5 × 4·5 × 10 cm high.

Each **£6·90** *fx*

EF-490

VOLTAGE REFERENCE BATTERY, *Mallory*, **single mercury cell, 1·35V.** A robust extremely stable d.c. reference voltage source which can provide a small d.c. current without damage. The e.m.f. of 1·35V remains constant within 1% from −20° to +70°C. Size 63 × 40 × 95 mm, in carrying case ... ... Each **£10·00** *fx*

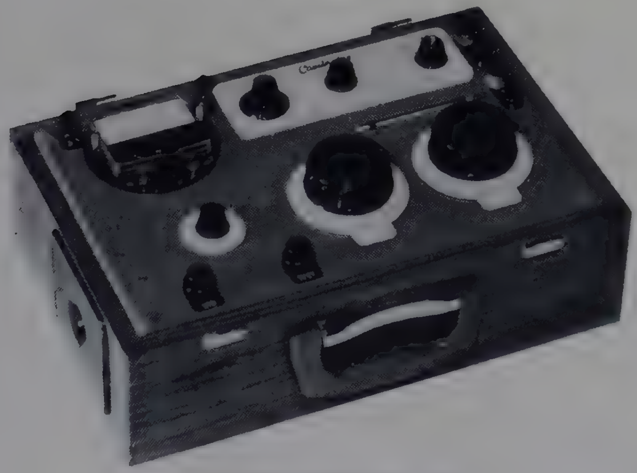
POTENTIOMETERS



EF-620

EF-620

POTENTIOMETER, range 0 to 1·8V d.c., accuracy ±0·5%. A main potential dial with 17 positions each equivalent to 0·1V is supplemented with a slide wire dial calibrated 0 to 100 mV in 100 sub-divisions. The instrument incorporates a calibration circuit, a sensitive moving coil galvanometer which is self-protected against normal overloads and a transparent base for viewing internal components. Supplied with operating manual. Dimensions 310 × 260 × 155 mm high. **Requires but does not include a 2V accumulator** ... Each **£59·00** *fx*



EF-628 without lid

EF-628

POTENTIOMETER, multi-purpose, range 0·01 to 101 mV d.c. A main potential dial with 100 click-stop steps of 1 mV each is supplemented with a fine potential slide wire dial from −0·05 mV to +1·05 mV divided in 0·01 mV. Accuracy is ±0·1% or $\pm\frac{1}{2}$ scale division, whichever is the greater. This completely self-contained instrument is particularly useful for checking the calibration of thermocouples and associated instruments. It has a built-in solid state detector and standard cell and the case provides a compartment for a battery. Dimensions 36 × 26 × 18 cm, weight 6 kg. **Requires but does not include a dry cell battery** ... Each **£120·00** *fxN*

A suitable battery is the *Mallory* RM42R.

EF-640

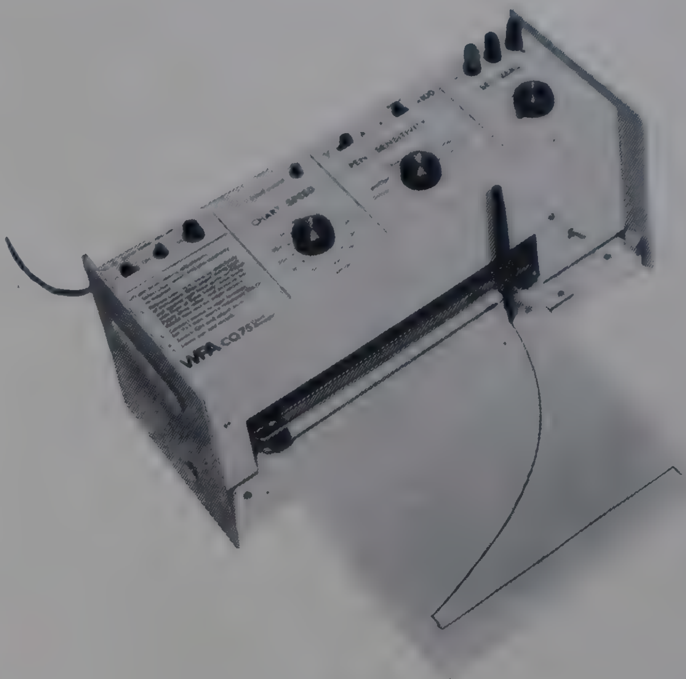
EF-640

WIDE RANGE A.C. POTENTIOMETER to measure a.c. potentials, currents and phase angles to about 2% accuracy at 50 Hz. Ranges are 5, 50 and 500 mV, 5, 50 and 500V, 25, 50 and 500 μA and 5, 50 and 500 mA. The instrument is a quadrature potentiometer, impedance 40,000 Ω/V, incorporating solid state calibration and null point circuits. The moving coil meter has a knife edge pointer and mirror scale to avoid parallax. The base of the case is transparent for viewing internal components. Supplied with operating manual.
Dimensions 310 × 260 × 155 mm high. For 200/240V a.c. single phase supplies ... ... Each **£139·00** *fx*

RECORDING POTENTIOMETERS

EF-660

STRIP RECORDER, potentiometric, for gas chromatography, electrochemistry, reaction kinetics and other general laboratory applications. Accepts foolscap, A4 sheets and strip chart paper up to 25 cm wide. Eleven chart speeds from 5 sec/cm to 1 hour/cm can be set by a knob with an 'off' position. Twenty-four input ranges from 1 mV/cm to 5V/cm and from 1µA/cm to 5mA/cm may be selected by another knob. Includes a zero-setting knob, event marker and on/off switch. X and Y axes drive motors are of the brushless, stepping type. Simple provision is made for pen-lift and paper release. The inexpensive, disposable fibre tip pen is driven in 0·5 mm steps and the drive mechanism gives an audible warning when the pen reaches one of the end stops. Input impedance is 1MΩ (recommended max. source resistance 10KΩ) on voltage ranges and 1000Ω on ×1 (10Ω on ×100) current ranges. Overall accuracy about ±2·5% f.s.d. Dimensions 16H × 36W × 15·5D cm. Weight 5·5 kg. For 230/250V 50/60 Hz single phase supplies ... ... Each **£95·00** *fx*


EF-660

ACCESSORIES

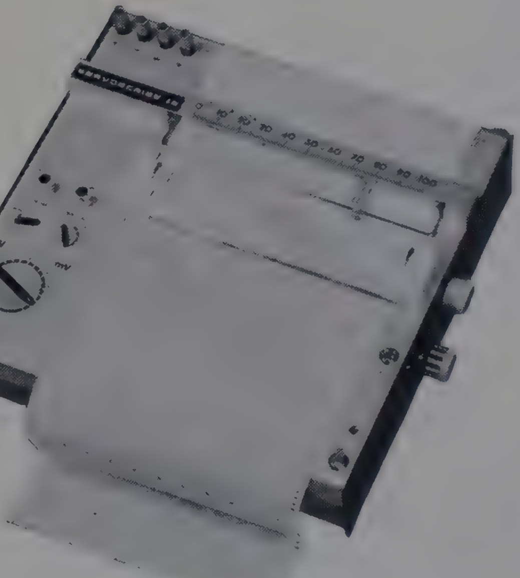
EF-662	**Paper roll attachment** with two ruled rolls	Each	**£7·80**	*fx*
EF-664	**Gas syringe attachment** for 100 cm³ syringe to drive pen. Supplied **without syringe**	Each	**£4·10**	*fx*

REPLACEMENT PART

EF-669	**Chart paper roll,** width 22 cm. Four rolls	**£4·50**	Roll	**£1·20**	*fx*

EF-680

RECORDING POTENTIOMETER, *Smith Servoscribe,* for continuous linear **single point** recording on perforated 20 cm (8 in) strip chart and standard graph paper size A4. Incorporates input range selection from 200 µV to 500V d.c., zero shift and zero suppression. Accuracy 0·5% f.s.d. or ±5 µV whichever is the greater, response 0·5 sec f.s.d. Eight synchronous chart speeds from 3 to 3600 cm/hr forward and reverse. Suitable for e.m.f. and thermocouple measurements. For 110/120 and 220/240V 50 Hz single phase supplies. Dimensions 39 × 35 × 13 cm, weight 8 kg ... ... Each **£325·00** *fx*


EF-680

REPLACEMENT PART

EF-682	**Chart paper** ...	10 rolls	**£9·00**	Roll	**£1·00**	*fx*

TITRATION POTENTIOMETER—see EJ-890 in List No. sequence.

ELECTRICAL THERMOMETERS

Digital reading. Range −20 to +300°C see TK-010.

Pointer reading. Ranges −50 to +50°C; 10 to 150°C see TK-070 and TK-075.

For full details and prices see entries in List No. sequence.

OSCILLOSCOPE

EF-926

OSCILLOSCOPE, suitable for educational use. Incorporates 7 cm dia. screen with 0·5 cm division graticule, focus and brilliance controls and adjustable 'Y' gain and shift. Frequency response 30 kHz at 100mV/div. Continuously variable gain control provides sensitivity range of 100mV/div to 50V/div. The time base has three preset sweep speeds 10mS/div., 1mS/div., and 100µS/div. A variable control provides continuous overlap between range positions. Provision is made for access to the 'X' amplifier. For 200/250V 50 Hz single phase supplies. Dimensions 15 × 15 × 23 cm, weight 2·5 kg. Each **£45·00** *mx*

EF-926

ELECTROCHEMICAL ANALYSIS

SECTION INDEX

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Karl Fischer apparatus—see **Water Determination.**

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pH buffer powders 209

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Titration potentiometer 214

Titration stand assemblies 215

Dissolved oxygen meter—see **Water and Sewage.**

CONDUCTIVITY

METER

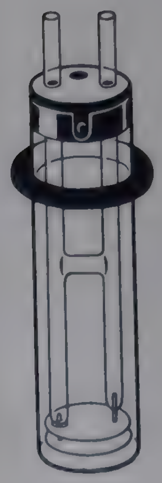
EJ-035

A conductivity meter for determining the amounts of inorganic impurities dissolved in very pure water such as boiler feed water. For the control of water treatment, deionisation and distillation plant and measurement of water pollution.

The hand driven generator incorporated in the meter develops an a.c. output to render polarisation negligible. Readings are independent of the speed at which the handle is turned and temperature compensation is automatic.

Overall dimensions:
Meter unit 15×10×6 cm.
Cell unit 14× 9×6 cm.
Weight, net 6 kg.

EJ-035
CONDUCTIVITY METER, *Dionic*, **portable, direct reading, range 0 to 10^5 micromhos/cm** as specification. Includes dual cell with stainless steel electrodes, constants 1·0 and 100. In carrying case ... ... Each **£103·00** *fx*



EJ-050

CELLS

EJ-050
CONDUCTIVITY CELLS, uncalibrated, (AG). Borosilicate glass cells with bright platinum disk electrodes supported by ebonite covers.

Conductivity range	High	Medium	Low	
Electrode dia.	11	15	22 mm	
Electrode separation	10·5	7	3·5 mm	
Each	**£24·00**	**25·00**	**40·00**	*ax*

CONDUCTIVITY

BRIDGES

The following two instruments are battery operated and measurement is by an a.c. bridge, energised at low potential by a 1000 Hz oscillator. The combination of low potential and high frequency obviates errors due to polarisation within the conductivity cell. Using the cells provided, measurement is possible over the stated ranges in three switched steps. The range selector switch also has a test position at which the bridge calibration can be checked.

CONDUCTIVITY MEASURING BRIDGE
µmhos

EJ-055

EJ-055

CONDUCTIVITY BRIDGE, *Electronic Switchgear,* **Type MC3, range 0·1 to 10^5 micromhos/cm,** as specification. A beaker type cell, which has a constant K = 1·0 and a sample volume of approximately 12 ml, plugs into the side of the bridge. Complete with one cell EJ-057, cell cleaning brush, thermometer 0–50°C and plastics carrying case. With *Ever Ready* Type PP4 battery.

Overall dimensions 24×19×9 cm

Weight, net 2 kg ... ... Each **£45·00** *fx*

REPLACEMENT PARTS

EJ-057	**Cell,** Type EBB/10, K = 1·0	Each	**£8·00**	*fx*
EJ-058	**Thermometer,** 0–50°C, without case...	Each	**£1·60**	cx

EJ-060

CONDUCTIVITY BRIDGE, *Electronic Switchgear,* **Type MC-1, range 0·1 to 10^6 micromhos/cm** as specification. Includes two conductivity cells EJ-084 having constants of 0·1 and 1·0 respectively. Temperature compensation facilities for dilute aqueous solutions (coeff 2% per degC) are provided over the range 10 to 10,000 µmhos/cm. Outside this range or for other solutions the compensation coefficient is calculated from measurements made at two different temperatures. Complete with thermometer 0–100°C, cell cleaning brush, and instructions. With *Ever Ready* Type PP7 battery. **With carrying case.**

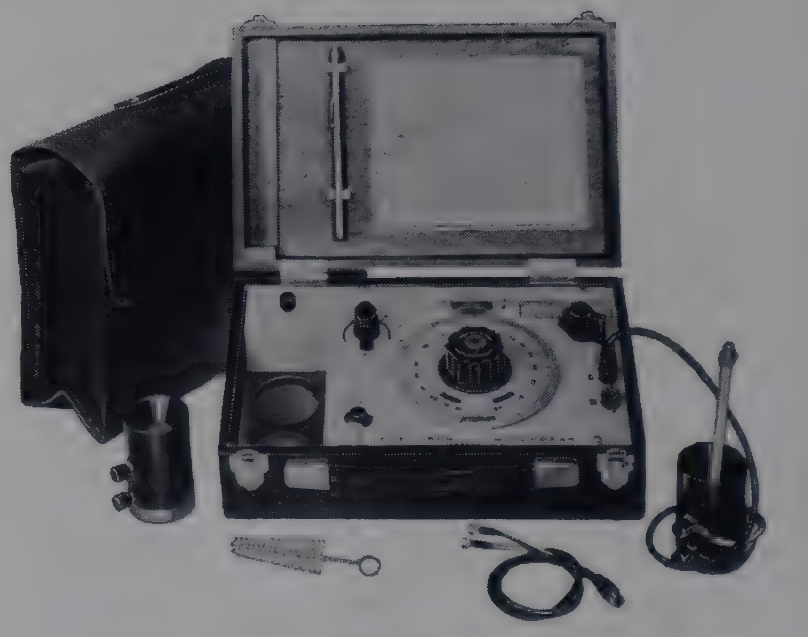
Overall dimensions 32×22×12 cm

Weight, net 3·6 kg ... ... Each **£80·00** *fx*

REPLACEMENT PARTS AND ACCESSORY

EJ-068	**Thermometer,** 0–100°C in case ...	Each	**£2·00**	*fx*
EJ-084	**Cells,** Type EBA. For price see entry in List No. sequence.			

Conductivity bridge, for soil testing see SH-120 in List No. sequence.



EJ-060

ACCESSORY CELLS

for EJ-055 and EJ-060

EJ-080

CONDUCTIVITY CELLS, type CCL, pipette type with rubber bulb.

Cell constant K	0·1	1·0	
Each	**£13·00**	**12·00**	*fx*

EJ-081

CONDUCTIVITY CELL, type EFB, flow line type, $\frac{1}{2}$ in bore with $\frac{1}{2}$ in B.S.P. thread. For max. 100°C and 100 lbf/in^2 working, or use as a beaker with end fittings provided.

Cell constant K	0·1	1·0	
Each	**£11·00**	**11·00**	*fx*

EJ-084

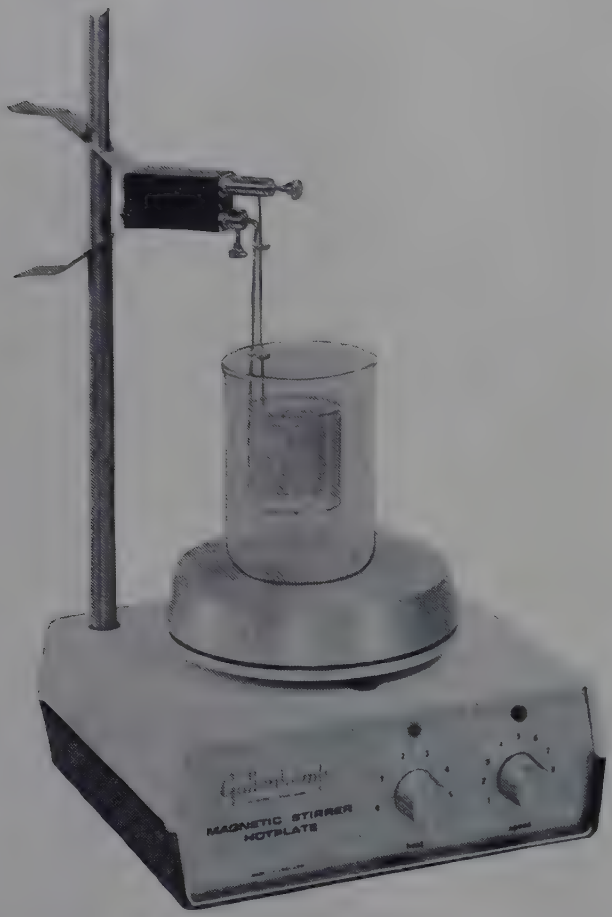
CONDUCTIVITY CELL, type EBA, general purpose beaker type. The cell has a funnel shaped entry to facilitate insertion of sample so that it is equally suitable for use with liquid sludges, wet soil samples and other similar materials. A removable base plug facilitates thorough cleaning.

Cell constant K	0·1	1·0	
Volume, approx.	25	12 ml	
Each	**£10·00**	**10·00**	*fx*

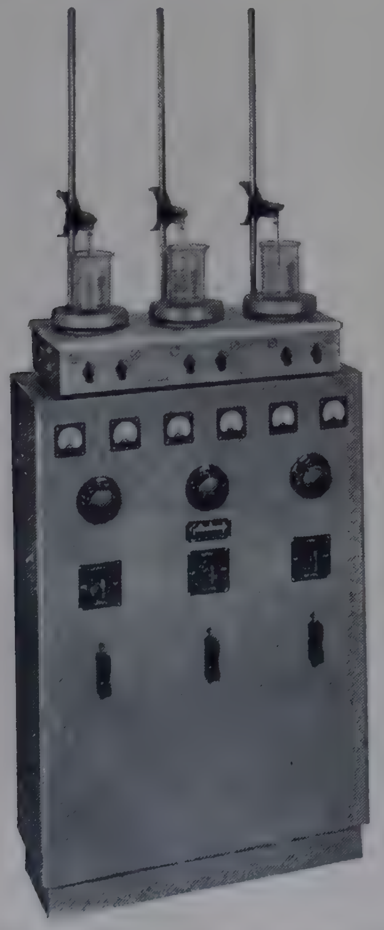
When ordering cells please specify constant required.

Gallenkamp ELECTRODEPOSITION ANALYSERS

with stationary electrodes and magnetic stirring for the estimation of any metal which can be determined gravimetrically after electrodeposition.



EJ-085 single test analyser with electrodes EJ-100 and EJ-101



EJ-085 three test analyser with power supply unit EJ-905

The electrodeposition analyser is made in two forms, a single and a three test unit, both of which have built-in magnetic stirrers and hotplates. The use of magnetic stirring in electrodeposition analysers has many advantages. Increased efficiency of agitation enables the metal to be deposited in two-thirds of the time compared with conventional apparatus, the space above the apparatus is left clear for the electrode holders, and spray during agitation is reduced to a minimum.

ANALYSER

Both analysers are bench mounting but the 3 test analyser is designed also to stand on the corresponding power supply unit. The analyser base is of rustproofed steel, finished in grey enamel. Inside this base are fitted the magnetic stirrer, speed control and energy regulator for the 12·5 cm diameter hotplate which is supported on the top of the base. The electrode holders, which are adjustable for height, are fitted on stainless steel rods at the rear of the analyser.

POWER SUPPLY UNIT

This comprises selenium full wave rectifiers and a double wound transformer in a ventilated metal case finished in stoved enamel. An ammeter and voltmeter are fitted in each circuit together with mains fuses and switch, and a variable resistance. Output from each circuit is 7A d.c. at 12V.

EJ-085

ELECTRODEPOSITION ANALYSERS, *Gallenkamp*, as specification, comprising stirrer/hotplates with speed controls, energy regulators, electrode support rods and holders. **Without d.c. power supply unit, beakers or electrodes.** For single phase supplies.

		1-test	3-test	
Base dimensions		23 × 16	23 × 52 cm	
For 200/240V 50 Hz	Each	**£42·00**	**123·00**	*bx*
For 110/120V 60 Hz	Each	**£42·50**	**124·50**	*bx*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

EJ-087	**Electrode holder,** complete with cable connection. Each **£11·00** *bx*
SS-634	**Magnetic followers,** ptfe, 20 mm and 40 mm. See entry in List No. sequence.

EJ-095

POWER SUPPLY UNIT, *Gallenkamp*, as specification, with ammeter, voltmeter and rheostat and with output of 7A d.c. at 12V from each circuit. For single phase supplies.

		1-test	3-test	
Dimensions		45 × 30 × 23	83 × 60 × 35 cm	
For 200/250V 50 Hz	Each	**£90·50**	**237·00**	*gx*
For 110/120V 60 Hz	Each	**£99·50**	**264·00**	*gxN*

When ordering please state voltage and frequency of supply.

EJ-100

INNER ELECTRODE, anode, platinum gauze cylinder, 32 × 32 × 140 mm overall height... ... Each **£85·00** *mx*

EJ-101

OUTER ELECTRODE, cathode, platinum gauze cylinder, 45 × 45 × 125 mm overall height. Each **£120·00** *mx*

ACCESSORIES

BJ-655	**Beaker,** 250 ml, squat form. For price see entry in List No. sequence.
EJ-105	**Beaker cover,** polythene, with slot to allow for entry of electrodes. Strongly recommended since it prevents the loss of solution as spray. Ten **£5·70** Each **£0·64** *bx*

pH METERS

SECTION INDEX

pH Meters	page	**Allied apparatus**	page
Digital reading	211	Buffer powders	209
Expanded scale	211/213	Electrodes	214
Portable, battery operated	209, 212	Titration potentiometer	214
Research	211/213	Titration stands...	215

BUFFER POWDERS

EJ-275

BUFFER POWDERS, for standardisation of pH meters. Supplied in sachets. Each pH 4 and pH 9 sachet makes up 100 ml of buffer and each pH 7 sachet makes up 200 ml. With instructions.

pH value at 20°C	4·0	7·0	9·0	
Pack qty.	50	25	50 sachets	
10 packs	**£32·00**	**32·00**	**32·00**	*cx*
Pack	**£ 3·60**	**3·60**	**3·60**	

OTHER APPARATUS FOR pH MEASUREMENT

Lovibond Nessleriser	see	CT-835 et seq.
Lovibond Comparator	see	CT-700 et seq.
Test Papers	see	TE-070 et seq.

For details and prices see entries in List No. sequence.

E.I.L. PORTABLE MODEL 30C

A battery operated instrument of high stability suitable for field and laboratory use.

Technical Data

Ranges	0 to 8 pH, 6 to 14 pH 0 to 800 mV, 600 to 1400 mV
Subdivisions	0·1 pH
Discrimination	0·05 pH
Accuracy	±0·1 pH or ±10 mV
Stability	0·05 pH/day or 3 mV/day after 1 hour warm up period
Temperature compensation	0–100°C automatic
Dimensions	18·5×14×8·5 cm
Weight	1·3 kg

EJ-460

pH METER, PORTABLE, *E.I.L.* **Model 30C,** as specification, with dual electrode, temperature compensator, *Ever Ready* battery PP9 and carrying case complete with wash bottle, beaker and buffer solution container.

Each **£101·50** *fx*

REPLACEMENT PARTS

EJ-464	**Dual electrode** SHDN33C	Each	**£8·50**	*fx*
EJ-468	**Temperature compensator** T30B ...	Each	**£8·00**	*fx*

ACCESSORY

EJ-275 **Buffer powders.** For details and prices see entry in List No. sequence.

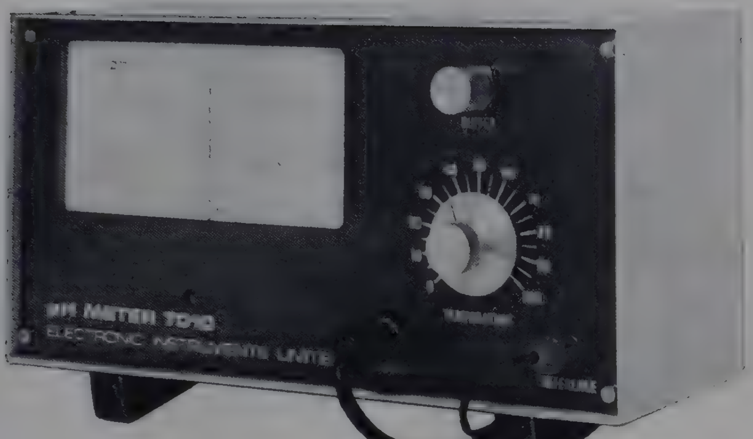
pH
Portable pH meter
Model 30C
EIL

EJ-460

E.I.L. pH METERS SERIES 70

A series of four pH meters designed to operate in ambient temperatures from approximately 0 to 35°C.

MODEL 7010



EJ-470

A simple direct reading pH meter intended for use in schools and colleges both for teaching and student use.

Technical Data

Ranges	0–14 pH 400–0–400 mV
Indicator accuracy	±1% f.s.d.
Indicator scale length	120 mm approx.
Temperature compensation	0–100°C manual
Isopotential	Fixed at 7 pH
Dimensions	140 × 240 × 100 mm approx.
Weight	1·5 kg approx.

EJ-470

pH METER, *E.I.L.* **Model 7010,** as specification including dual electrode, buffer powders and potassium chloride. For 220/250V 50 Hz single phase supplies. Each **£50·00** *fx*

REPLACEMENT PART

EJ-464	**Dual electrode** SHDN33C. For price see entry in List No. sequence.

ACCESSORIES

EJ-474	**Glass electrode**	Each	**£6·00**	*fx*
EJ-475	**Calomel reference electrode** ...	Each	**£4·60**	*fx*
EJ-275	**Buffer powders.** For price see entries in List No. sequence.			

MODEL 7020

ELECTRONIC INSTRUMENTS LIMITED
pH METER 7020

EJ-480

A direct reading, large scale, general purpose pH meter for use in industrial and educational laboratories.

Technical Data

Ranges	0–14 pH 1400–0–1400 mV
Indicator accuracy	±1% f.s.d.
Indicator scale length	220 mm approx.
Temperature compensation	0–100°C manual 0–100°C automatic with temperature compensator accessory
Recorder output	0·7–0–0·7 mA into up to 5 kΩ
Isopotential	Fixed at 5·6 pH
Dimensions	220 × 320 × 115 mm approx.
Weight	4·5 kg approx.

EJ-480

pH METER, *E.I.L.* **Model 7020,** as specification, including dual electrode, electrode holder, buffer powders, potassium chloride and manual temperature compensation. For 220/250V 50 Hz single phase supplies.

Each **£98·00** *fx*

REPLACEMENT PART

EJ-464	**Dual electrode** SHDN33C. For price see entry in List No. sequence.

ACCESSORIES

EJ-484	**Temperature compensator,** 7021, for automatic compensation for sample temperature changes.	Each **£10·00** *fx*
EJ-474	**Glass electrode**	For prices see entries in List No. sequence.
EJ-475	**Calomel reference electrode**...	
EJ-275	**Buffer powders**	

MODEL 7030

A versatile pH meter, with expanded scale facilities, for use in research and industrial laboratories.

Technical Data

Ranges	0–14 pH full scale 3 pH expanded scale 3 decade ionic concentration
Indicator accuracy	±0·5% f.s.d.
Indicator scale length	200 mm linear scale
Stability	typically better than ±0·04 pH for an ambient temperature change of ±10°C from 25°C
Input resistance	suitable for electrodes up to 1000 MΩ
Temperature compensation	—20 to +120°C manual (or automatic with accessory), corrected for slope and zero on 0–14 pH range and slope only on 3 pH range
Isopotential	5·6 pH from 0–40°C with local electrode and 7·5 pH from 20–100°C with remote electrode
Slope adjustment	3 decade ionic concentration range: 75 to 110%
Recorder output	100 mV from source resistance of approx. 260Ω
Dimensions	180×360×270 mm approx.
Weight	6·5 kg approx.

EJ-490

pH METER, *E.I.L.* **Model 7030,** as specification, including separate glass and calomel reference electrodes, buffer powders, electrode stand and manual temperature compensation. For 110/120V or 200/240V 50/60 Hz single phase supplies ... ... Each **£165·00** *fxN*

When ordering please state voltage and frequency of supply.

EJ-490

REPLACEMENT PARTS

EJ-474	Glass electrode	For prices see entries in List No. sequence.
EJ-475	Calomel reference electrode...	

ACCESSORIES

EJ-494	Temperature compensator, 3921, for automatic compensation for sample temperature changes.	Each **£12·00** *fxN*
EJ-464	Dual electrode	For prices see entries in List No. sequence.
EJ-275	Buffer powders	

MODEL 7040

A wide range versatile pH meter, with illuminated digital readout, for use in industrial and research laboratories.

Technical Data

Ranges	0–14 pH 1400–0–1400 mV with automatic polarity indication
Indication	3½ digit, 7 segment presentation
Indicator accuracy	±0·2% of span
Stability	typically better than ±0·03 pH for ambient temperature change of ±10°C from 25°C
Input resistance	suitable for electrodes up to 1000 MΩ
Temperature compensation	—20 to +120°C manual (or automatic with accessory) corrected for slope and zero
Isopotential	5·6 pH from 0–40°C with local electrode and 7·5 pH from 20–100°C with remote electrode
Recorder output	100 mV from source resistance of approx. 260Ω
Dimensions	180×360×270 mm approx.
Weight	5·5 kg approx.

EJ-500

pH METER, *E.I.L.* **Model 7040, digital readout,** as specification, including separate glass and calomel reference electrodes, buffer powders and electrode stand. For 110/120V or 200/240V 50/60 Hz single phase supplies. Each **£280·00** *fxN*

When ordering please state voltage and frequency of supply.

EJ-500

REPLACEMENT PARTS

EJ-474	Glass electrode	For prices see entries in List No. sequence.
EJ-475	Calomel reference electrode...	

ACCESSORIES

EJ-464	Dual electrode	For prices see entries in List No. sequence.
EJ-494	Temperature compensator ...	
EJ-275	Buffer powders	

PYE UNICAM pH METERS

PORTABLE MODEL 293

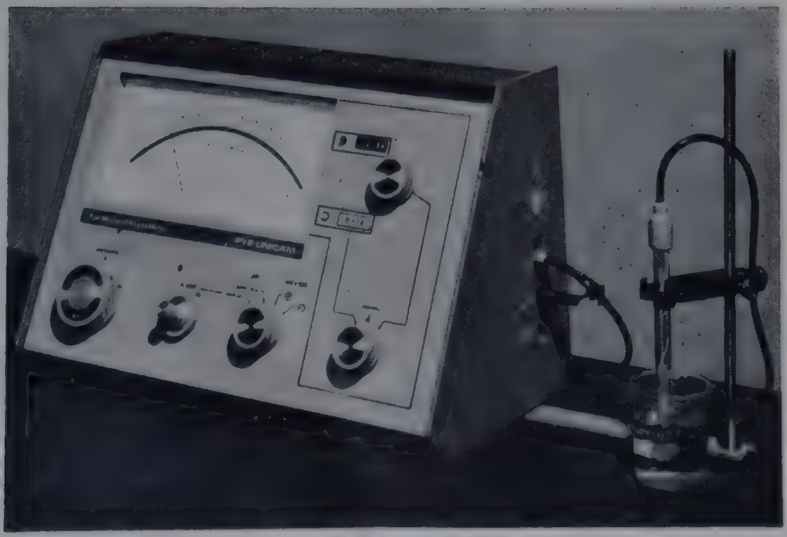
A battery operated direct reading pH meter with solid state circuitry.

Technical Data

Ranges	0 to 14 pH ±700 mV
Meter	120 mm scale with subdivisions of 0·1 pH and 10 mV
Drift	Less than 0·1 pH/24 hours
Temperature compensation	Manual 0 to 100°C Automatic 0 to 100°C with resistance thermometer accessory
Power supply	2×4V *Mallory* long life batteries
Dimensions	160×190×80 mm
Weight	2 kg

pH
Pye Model 293 pH Meter
PYE UNICAM
Battery Check
Off
Stand By
pH
mV
Temperature °C
Asymmetry

EJ-645



EJ-655

EJ-645

pH METER, *Pye Unicam* **Model 293,** as specification, complete with type 450 E7 combined glass and reference electrode and batteries but without resistance thermometer or buffer powders ... ... Each **£68·00** *fx*

REPLACEMENT PART

EJ-703	**Combined electrode,** polythene sheathed, type 450 E7. For details and price see entry in List No. sequence.

ACCESSORIES

EJ-647	**Resistance thermometer,** type 627 ... Each **£11·50** *fx*
EJ-275	**Buffer powders.** For details and prices see entry in List No. sequence.

MODEL 290

A sensitive rugged pH meter, with a wide scale meter and expanded ranges facilities. Outputs are provided for chart recorder operation. **A most important feature of the instrument is its very high long term stability.**

Technical Data

Ranges	0 to 14 pH and 14 expanded ranges of 1·4 pH 0 to ±1400 mV and 14 expanded ranges of 140 mV
Meter	185 mm scale with sub-divisions of 0·01 pH and 1·0 mV
Drift	Less than 0·002 pH/24 hours
Input impedance	5×10¹² ohms
Temperature compensation	Manual 0 to 100°C Automatic −5 to 100°C with resistance thermometer accessory
Earthed solution	Equally suitable for earthed and unearthed solutions
Power supply	100/120 and 200/250V 50/60 Hz
Dimensions	394×216×254 mm
Weight	8·5 kg

EJ-655

pH METER, *Pye Unicam* **Model 290,** as specification, complete with type 401 E7 combined glass and reference electrode EJ-700, integral electrode stand and holder, jack plug and coaxial adapter but without resistance thermometer or buffer powders ... ... Each **£212·00** *fx*

REPLACEMENT PART

EJ-700	**Combined electrode,** type 401 E7. For details and price see entry in List No. sequence.

ACCESSORIES

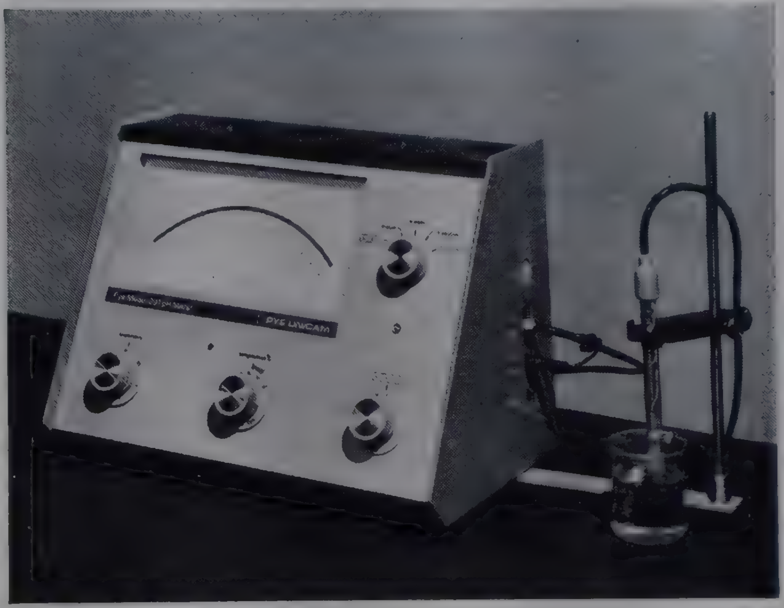
EJ-657	**Resistance thermometer,** type 625, for use with Model 290 pH meters with **serial numbers below 116355** and also Models 291 and 292 pH meters. Each **£11·50** *fx*	
EJ-658	**Resistance thermometer,** type 626, for use with Model 290 pH meters with **serial numbers above 116354** ... ... Each **£11·50** *fx*	
EJ-275	**Buffer powders**	For details and prices see entries in List No. sequence.
EJ-702	**Combined miniature electrode** ...	
EJ-704	**Glass electrode**	
EJ-710	**Reference electrode**	

MODEL 291

A versatile pH meter with expanded scale facilities for use in industrial and research laboratories.

Technical Data

Ranges	0 to 14 pH and an expanded range of 2·8 pH for f.s.d. 0 to 1400 mV and an expanded range of 280 mV for f.s.d.
Meter	185 mm scale with sub-divisions of 0·1 pH and 10 mV
Drift	Less than 0·002 pH/24 hours
Temperature compensation	Manual 0 to 100°C Automatic −5 to 100°C with resistance thermometer accessory
Input impedance	5×10^{12} ohms
Power supply	100/120V and 200/250V 50/60 Hz
Dimensions	360 × 216 × 254 mm
Weight	6·5 kg



EJ-675

EJ-675

pH METER, *Pye Unicam* **Model 291,** as specification, complete with combined glass and reference electrode EJ-700, integral electrode stand and holder, jack plug and coaxial adapter but without resistance thermometer or buffer powders ... ... Each **£158·00** *fx*

REPLACEMENT PART

EJ-700 **Combined electrode,** type 401 E7. For details and price see entry in List No. sequence.

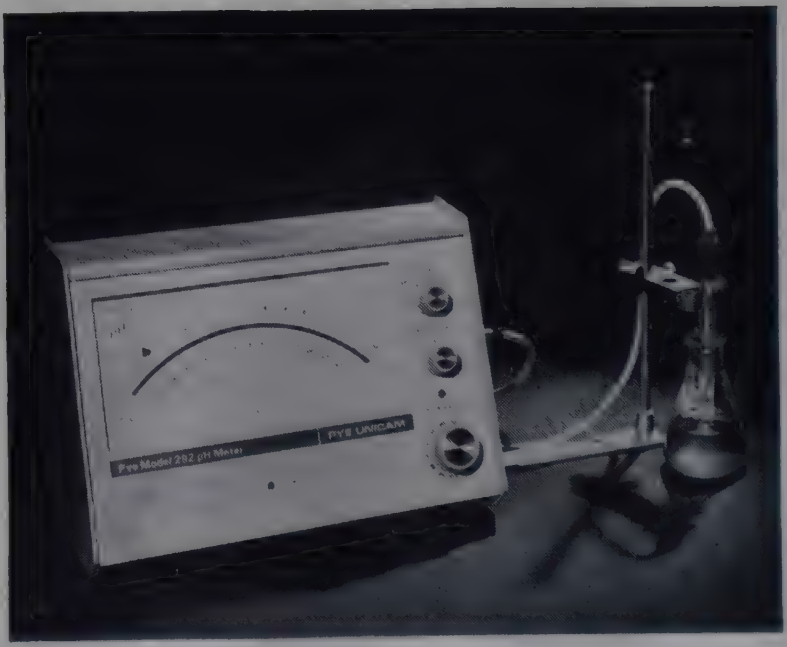
ACCESSORIES—see below.

MODEL 292

A direct reading, large scale, general purpose pH meter for use in industrial and educational laboratories.

Technical Data

Range	0 to 14 pH ±700 mV
Meter	185 mm scale with sub-divisions of 0·1 pH and 10 mV
Drift	Less than 0·002 pH/24 hours
Temperature compensation	Manual 0 to 100°C Automatic −5 to 100°C with resistance thermometer accessory
Input impedance	10^{12} ohms
Power supply	200/250V 50/60 Hz
Dimensions	285 × 165 × 203 mm
Weight	4·8 kg



EJ-685

EJ-685

pH METER, *Pye Unicam* **Model 292,** as specification, complete with combined glass and reference electrode EJ-700, integral electrode stand and holder, jack plug and coaxial adapter but without resistance thermometer or buffer powders ... ... Each **£94·50** *fx*

REPLACEMENT PART

EJ-700 **Combined electrode** type 401 E7. For details and price see entry in List No. sequence.

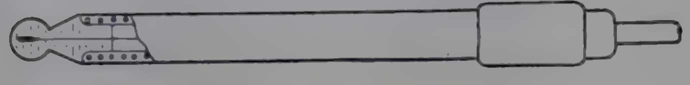
ACCESSORIES for EJ-675 and EJ-685

EJ-657	**Resistance thermometer,** type 625 ...
EJ-275	**Buffer powders** ... ...
EJ-702	**Combined miniature electrode** ...
EJ-704	**Glass electrode** ... ...
EJ-710	**Reference electrode**

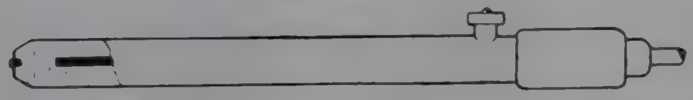
For details and prices see entries in List No. sequence.

ELECTRODES FOR PYE-UNICAM pH METERS

(Manufactured by Pye Unicam Ltd., under licence from Dr. W. Ingold, Zurich)



EJ-700



EJ-710

All the combination electrodes in this range are of the $E_0 7$ type which give zero output at pH 7. Because the filling of $E_0 7$ electrodes is virtually neutral (pH 7), internal chemical attack over long storage periods and when used at high temperatures is negligible. Moreover temperature compensation is more easily and accurately achieved than is the case with electrodes having other E_0 values.

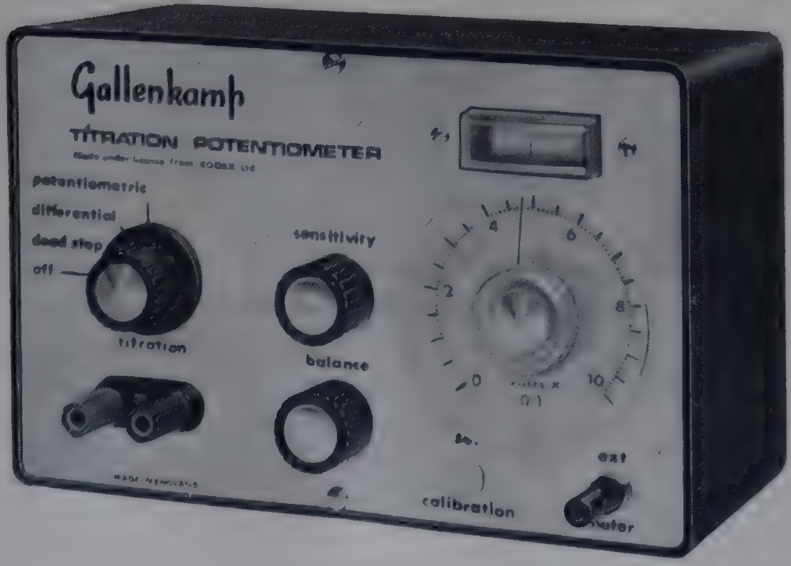
List No.	Type No.	pH range	Temp. range °C	Stem dia. mm	Length mm	Description	Each	
							£	
EJ-700	401 E7	0—12	10 to 70	12	120	Combined glass bulb electrode and silver/silver chloride reference electrode.	**9·00**	*fx*
EJ-702	401 M5E7	0—11	10 to 70	5	120	Combined glass bulb electrode and silver/silver chloride reference electrode, miniature pattern.	**12·20**	*fx*
EJ-703	450 E7	0—12	10 to 70	18	105	A combined glass bulb and silver/silver chloride reference electrode sheathed in polythene.	**9·20**	*fx*
EJ-704	201 E7	0—12	10 to 70	12	120	Glass bulb electrode.	**6·60**	*fx*
EJ-710	303	—	0 to 70	12	120	Calomel reference electrode with porous ceramic plug tip.	**5·60**	*fx*

Gallenkamp TITRATION POTENTIOMETER

Manufactured under licence from Kodak Ltd.

- **Suitable for potentiometric, differential or dead-stop titrations**
- **Transistor circuit suitable for most common electrodes except glass pH electrodes**

A self-contained battery operated potentiometer suitable for use with most electrodes **except glass pH electrodes.** The dial is calibrated 0 to 1V in 10 mV steps and out of balance voltages of 2 mV are detectable. A switch selects the titration function required and controls are fitted for calibration, sensitivity and balance. A socket is provided for connecting a high sensitivity external meter. Overall dimensions 19 × 10 × 12 cm high; weight 1 kg.



EJ-890

EJ-890

TITRATION POTENTIOMETER, *Gallenkamp*, transistorised, as specification, range 0 to 1V, with built-in null meter and three batteries, *Mallory* Type Mn 1500.
Each **£25·00** *bx*

ACCESSORIES

EJ-894	**Reference electrode,** calomel, stem dia. 15 mm, stem length 15 cm	Each	**£4·00**	*fx*
EJ-896	**Platinum foil electrode,** stem dia. 6 mm, stem length 12 cm	Each	**£5·00**	*fx*
EJ-898	**Silver foil electrode,** stem dia. 6 mm, stem length 12 cm	Each	**£5·00**	*fx*
EF-490	**Battery, voltage reference for potentiometer calibration**	For details and prices see entries in List No. sequence.		
EJ-920 et seq.	**Titration stand assemblies**			
SS-626 et seq.	**Magnetic followers...** ...			

Gallenkamp TITRATION STAND ASSEMBLIES

One assembly is based on an unheated magnetic stirrer, the other on a magnetic stirrer with hotplate. The stirring speeds of both are variable and each assembly is fitted with a burette holder for burettes of capacities 5 cm³ to 25 cm³. The electrode holder with quick release bosshead enables the electrodes to be lifted clear of the titration vessel between tests.

EJ-920

TITRATION STAND ASSEMBLY, *Gallenkamp,* **unheated,** as specification, for **ambient temperature titrations.** Comprising:

SM-452	Support rod, stainless steel, size D.
SM-636	Bosshead.
SM-638	Bosshead, quick release.
SM-682	Burette holder, 10 mm clips.
SM-683	Electrode/thermometer holder.
SS-660	Magnetic stirrer.

For 200/240V 50 Hz single phase supplies.
Assembly **£24·50** *bx*

For 100/120V 60 Hz single phase supplies.
Assembly **£25·00** *bx*

When ordering please state voltage and frequency of supply.

EJ-925

TITRATION STAND ASSEMBLY, *Gallenkamp,* **heated,** as specification, for **ambient and higher temperature titrations.** Comprising:

SM-452	Support rod, stainless steel, size D.
SM-636	Bosshead.
SM-638	Bosshead, quick release.
SM-682	Burette holder, 10 mm clips.
SM-683	Electrode/thermometer holder.
SS-670	Magnetic stirrer/hotplate.

For 200/240V 50 Hz single phase supplies.
Assembly **£34·50** *bx*

For 100/120V 60 Hz single phase supplies.
Assembly **£35·00** *bx*

When ordering please state voltage and frequency of supply.

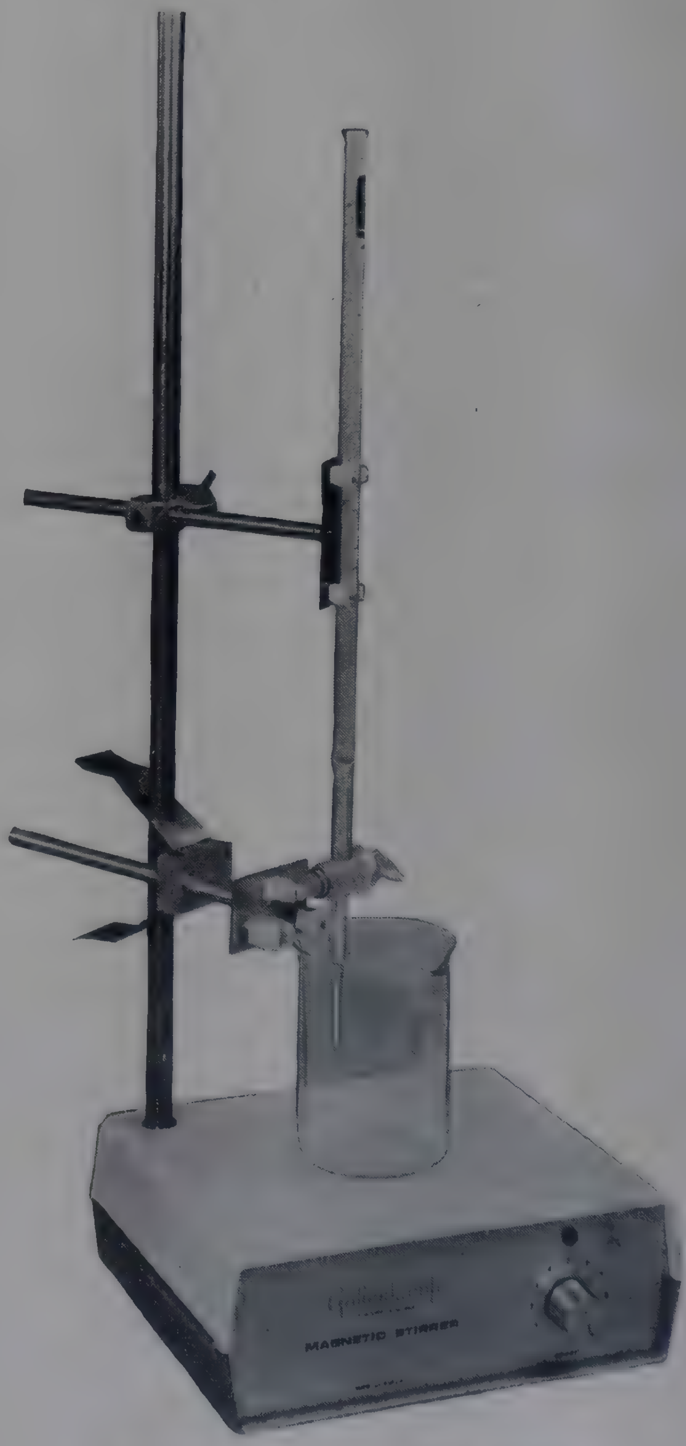
ACCESSORIES for EJ-920 and EJ-925

SM-682	**Burette holder** with 6 mm clips for 1 and 2 cm³ burettes and 13 mm clips 50 cm³ burettes	For details and prices see entries in List No. sequence.
SS-732	**Magnetic followers,** glass	
SS-734	**Magnetic followers,** ptfe	
SS-736	**Magnetic followers,** polypropylene ...	

For suitable pH meters and electrodes see pages 209 to 214. Other accessories will be found under page headings Beakers and Burettes. See also SS-675 Magnetic stirrer/hotplate with thermostic control.

For electrometric titrations at ambient or elevated temperatures.

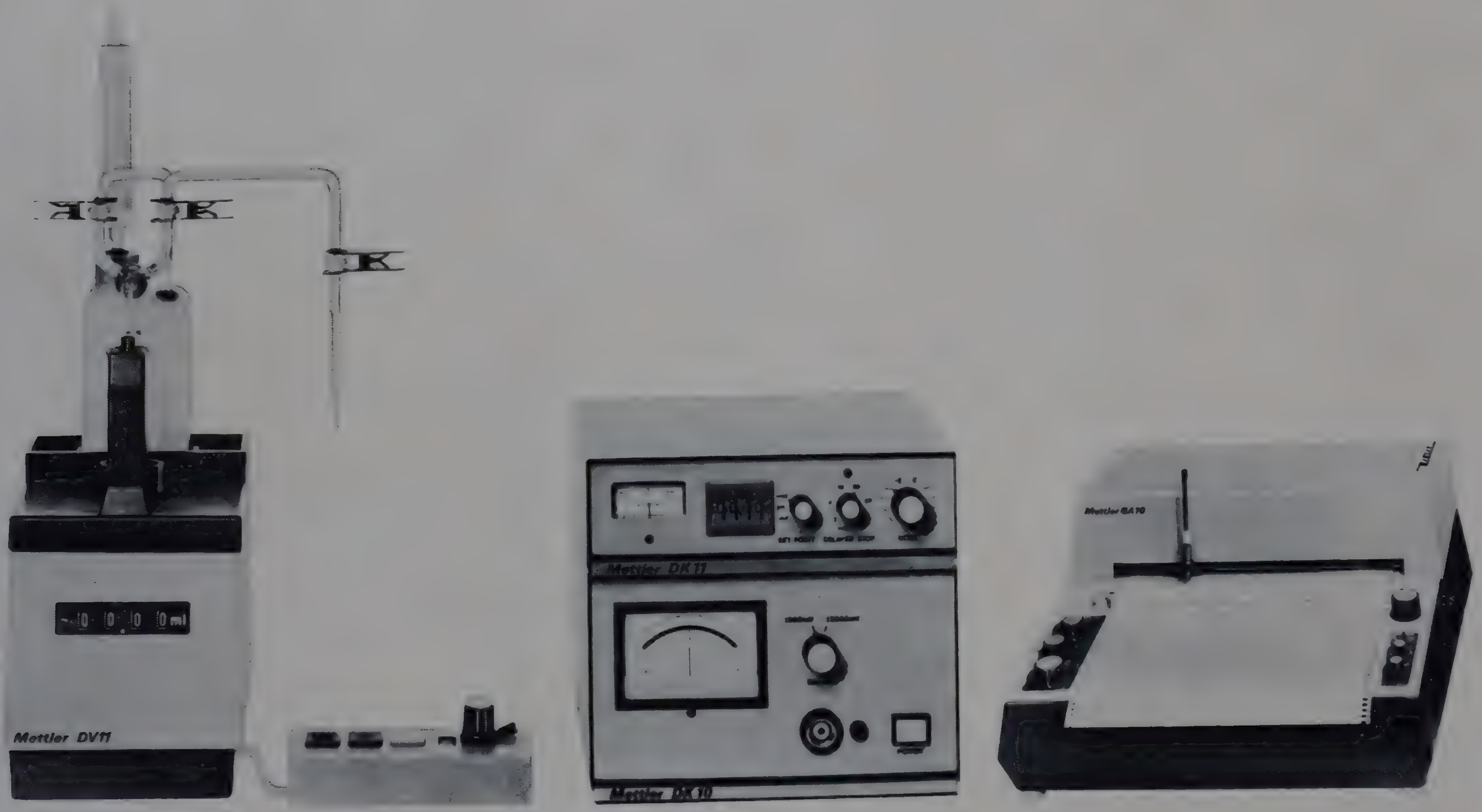
- **Efficient variable magnetic stirring**
- **Convenient and quick to use**
- **Accepts standard electrodes, burettes and thermometers**



EJ-920 with burette and beaker

METTLER MODULAR TITRATION SYSTEM

A compact, versatile system comprising a number of compatible modules which may be used singly or in combinations for a wide variety of manual and automatic titrations with a choice of readout, printout and connection to computers and data processers.



EL-570, EL-640, EL-650 and EL-730

APPLICATIONS

- Simple manually controlled titrations with a digital burette
- Manually controlled potentiometric titrations with meter readout of electrode potential
- Manually controlled potentiometric titrations with recording of titration curves or their first derivatives
- Automatically controlled potentiometric titrations with recording of titration curves or their first derivatives
- Automatic titrations to preset potentiometric end points
- Automatic titrations to preset values of pX eg. pH, pCa, etc., with manual or auto temperature compensation
- Automatic recording of pX titration curves or their first derivatives with manual or auto temperature compensation
- Manual or automatic 'dead stop' titrations eg. Karl Fischer water determinations
- Automatic recording of dV/dt reaction kinetics curves under pX-stat conditions eg. saponification of esters at elevated pH

METTLER TITRATION SYSTEM MODULES

All inter-connections between modules are made by a system of plugs and sockets with location keys which prevent inadvertent misconnection.

BURETTE DRIVE MODULES

Standard model (*Mettler* DV10)

Comprises a drive mechanism for use with a range of interchangeable burette heads having various volumes. It may be controlled manually or automatically and gives a pulse output for electrical synchronisation between volume delivered and the chart recorder volume axis. Includes digital display reading to 0·1% of burette volume with automatic decimal setting.

Analogue model (*Mettler* DV11)

Similar to the standard model but additionally giving voltage analogue output proportional to volume delivered for pX stat recording.

BURETTE MODULES (*Mettler* DV101, 102, 104 and 105)

Four interchangeable glass burettes, volumes 10 ml, 1 ml, 20 ml and 50 ml respectively. Each comprises an assembly complete with 500 ml polythene reservoir, mounted on a pallet for rapid attachment to a drive module which operates the burette piston. Delivery accuracy is about ±0·3%.

COMMAND MODULE (*Mettler* DV103)

This module incorporates a delivery rate control and three operating buttons. One button initiates automatic refilling and zeroing of the burette, the second starts automatic titration (or causes delivery of 1% of burette volume each time it is depressed), and the third stops an automatic titration (or causes continuous delivery until it is released).

ELECTRODE POTENTIAL AMPLIFIER (*Mettler* DK10)

This is the basic module for automation of the digital burette system. It converts an input electrode potential of high resistance sensors such as glass electrodes with impedances up to 10^{10} ohms into the identical potential at low output impedance. This enables the potential to be displayed on a chart recorder or digital voltmeter, or to operate the automatic titration modules. It has meter readout and a range switch for ±2000 mV and ±500 mV full scale deflection. Output signals are electrode potential, first derivative of electrode potential (dE/dt) and 0·1 × first derivative. Accuracy is ±0·2% ±1 mV.

RATE AND END POINT CONTROL MODULE

(*Mettler* DK11)

When used in conjunction with the Electrode Potential Amplifier, this module stops an automatic titration when a preset end point has been reached. In addition to the presetting dials it incorporates a deviation meter. It provides:

- —automatic slope fitting in which rate of titrant addition is automatically minimum when rate of change of potential of the electrode system is maximum.
- —delayed stop to ensure that end points are reached and that titrations are not prematurely terminated.
- —selection of mV or pX end points (the latter requires the E—pX Converter to be incorporated in the system).
- —adjustment for the + or — sense and the steepness of the titration curve.

E—pX CONVERTER (*Mettler* DK12)

An electrode potential–to–pH or –p Ion converter which provides pX output signals. Three controls are built-in for setting up electrode parameters viz. isopotential values, iso–pX values and dE/dpX slope values, as well as provision for manual or automatic temperature compensation.

DIGITAL DISPLAY MODULE (*Mettler* DK13)

Provides a four-digit display of electrode potential or pX together with BCD output. Measuring range ±1·999V and 0·00 to 19·99 pX with accuracy ±0·1% ±1 digit.

POLARISATION CURRENT ADAPTER (*Mettler* DK101)

A small battery powered module (battery life >2000 hrs) for use with the Electrode Potential Amplifier to provide electrode polarisation for Karl Fischer, dead stop and other voltametric end point titrations. Current range 0·2 to 10 μA.

POTENTIOMETRIC RECORDER (*Mettler* GA10)

A pulse driven, strip chart XY recorder with ranges from 1 mV to 5V for:

- —potentiometric titrations, displaying potential or first derivative against volume. The stepping motor drive ensures precise volume axis synchronism.
- —reaction kinetics displays of volume delivered against time.

METTLER TITRATION SYSTEM

OUTFITS

*EL-500

TITRATION OUTFIT, *Mettler*, for automatic titrations to preset potential end points. Comprises burette drive module (standard model), burette module (state volume required), electrode potential amplifier and rate and end point control module. **Without titration stand or electrodes.** Power supplies, please see Note 1 below. Price from **£1032·00** *kxN*

*EL-510

TITRATION OUTFIT, *Mettler*, for automatic titrations to preset pX or potential end points. Comprises burette drive module (standard model), burette module (state volume required), electrode potential amplifier, rate and end point control module and E—pX converter. **Without titration stand or electrodes.** Power supplies, please see Note 1 below ... ... Price from **£1132·00** *kxN*

NOTE 1:

Please state on order whether outfit required for 90/135V or 180/250V 50/60 Hz mains electricity supplies.

*EL-520

TITRATION OUTFIT, *Mettler*, for automatic plotting of potentiometric curves and automatic titrations to preset potential end points. Comprises burette drive module (standard model), burette module (state volume required), electrode potential amplifier, rate and end point control module and potentiometric recorder. **Without titration stand or electrodes.** Power supplies, please see Note 1 below. Price from **£1785·00** *kxN*

*EL-530

TITRATION OUTFIT, *Mettler*, for automatic plotting of pX or potentiometric curves and automatic titrations to preset pX or potential end points. Comprises burette drive module (standard model), burette module (state volume required), electrode potential amplifier, rate and end point control module, E—pX converter and potentiometric recorder. **Without titration stand or electrodes.** Power supplies, please see Note 1 below. Price from **£2156·00** *kxN*

NOTE 2:

Digital display module **EL-680** may be added to each of the above titration outfits.

MODULES

*EL-560

BURETTE DRIVE MODULE, *Mettler* DV10, **standard model** with pulse output. Includes Command Module EL-620 ... ... Each **£301·00** *kxN*

*EL-570

BURETTE DRIVE MODULE, *Mettler* DV11, **analogue model.** Includes Command Module EL-620. Each **£361·00** *kxN*

*EL-590

BURETTE MODULE, *Mettler*, complete with burette and piston, 3-way stopcock, reservoir and delivery jet.

Mettler ref.	Capacity ml	Each	
		£	
DV101	10	**52·00**	*kxN*
DV102	1	**52·00**	*kxN*
DV104	20	**96·00**	*kxN*
DV105	50	**96·00**	*kxN*

When ordering please state capacity required.

*EL-620

COMMAND MODULE, *Mettler* DV103. Included as standard part of Burette Drive Modules EL-560 and EL-570 ... ... Each **£33·00** *kxN*

*EL-640

ELECTRODE POTENTIAL AMPLIFIER, *Mettler* DK10 ... ... Each **£364·00** *kxN*

*EL-650

RATE AND END POINT CONTROL MODULE, *Mettler* DK11 ... ... Each **£271·00** *kxN*

*EL-660

E—pX CONVERTER, *Mettler* DK12, for manual temperature compensation ... ... Each **£371·00** *kxN*

ACCESSORY

TK-018 **RESISTANCE THERMOMETER,** *Mettler* TM106, for auto temperature compensation of EL-660. For price see entry in List No. sequence.

*EL-680

DIGITAL DISPLAY MODULE, *Mettler* DK13. Each **£576·00** *kxN*

*EL-710

POLARISATION CURRENT ADAPTER, *Mettler* DK101 ... ... Each **£38·00** *kxN*

*EL-730

POTENTIOMETRIC RECORDER, strip chart, *Mettler* GA10 ... ... Each **£753·00** *kxN*

All electrical components are available for 90/135V or 180/250V 50/60 Hz mains electricity supplies. Please state voltage and frequency when ordering.

Gallenkamp ROTARY THIN FILM EVAPORATOR

DESIGN
A precision ground glass sleeve, driven by a rim-drive mechanism in the motor housing, rotates over a stationary precision ground tube, the two glass members forming a rotating seal when lubricated with silicone oil.
Either the purpose made evaporator flask EU-114, which has a long neck to prevent lubricating oil entering the flask or, an ordinary 24/29 socket necked flask used with the cone-to-cone adapter can be attached and clipped to the rotating member. A lipped, moulded washer between the drive mechanism and the rotating member prevents the evaporator flask from slipping when the vacuum is released.
The stationary member is fitted with a sample feed tube with stopcock and a spherical joint side tube. This side tube optionally accepts an adapter for 6·5 mm bore vacuum tubing (when distillate runs to waste) or a vertical distillate receiver flask/condenser assembly with vacuum tubing adapter at the top of the condenser (when distillate is to be collected).
The whole assembly is mounted on a stand in a manner which allows the height and angle of the glassware to be adjusted.
Accessory condenser Q-CX6/33 is required when very volatile solvents are being removed.

DIMENSIONS

Overall length	600 mm
Height of stand	700 mm
Weight, net, with stand	6 kg

EU-100

THIN FILM EVAPORATOR, *Gallenkamp*, as specification, **for evaporations in which distillate is run to waste.** Comprises stand, motor housing, 500 ml long cone necked evaporator flask, sleeve assembly, inlet tube with stopcock, vacuum tubing adapter, joint clips and bottle of silicone oil.

For 200/250V 50 Hz single phase supplies.	Each	**£46·50**	*bx*
For 110/120V 60 Hz single phase supplies.	Each	**£47·00**	*bx*

EU-105

THIN FILM EVAPORATOR, *Gallenkamp*, for evaporations, **in which distillate is either run to waste or is collected.** Comprises one EU-100 with glass adapter, 500 ml collector flask, double surface condenser and stand fittings.

For 200/250V 50 Hz single phase supplies.	Each	**£57·50**	*bx*
For 110/120V 60 Hz single phase supplies.	Each	**£58·00**	*bx*

EU-108

CONVERSION SET, comprising adapter, collector flask, condenser and stand fittings to convert EU-100 to EU-105 ... ... Each **£11·00** *mx*

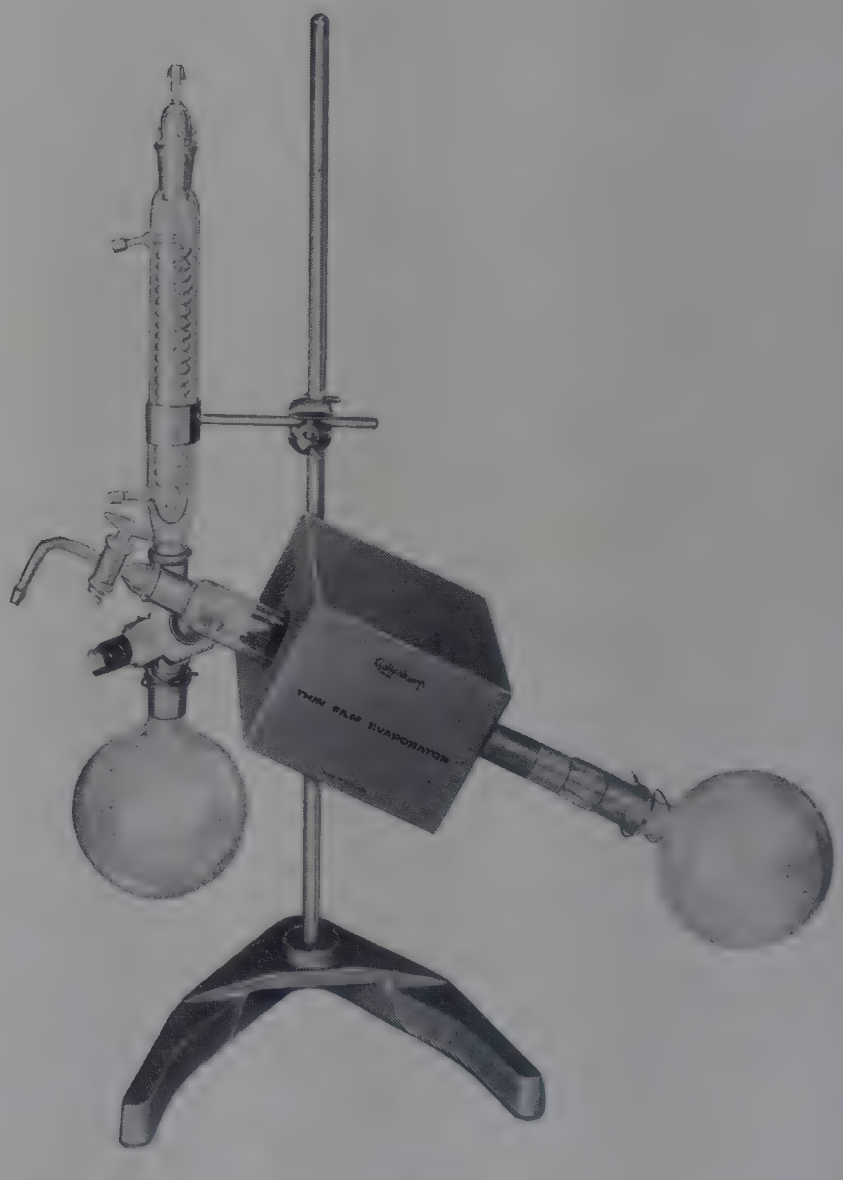
REPLACEMENT PARTS for EU-100 and EU-105

EU-112	**Glass seal assembly**	Each	**£6·50**	*ax*
EU-114	**Evaporator flasks,** long necked. Capacity 250 500 1000 ml Each £1·50 1·70 2·75			*ax*
EU-116	**Vacuum adapter,** spherical joint	Each	**£1·55**	*ax*
EU-120	**Inlet tube** with stopcock	Each	**£2·15**	*ax*
EU-124	**Silicone oil,** 25 ml	Each	**£0·40**	*bx*
***EU-126**	**Clip** for conical ground joints	Each	**£0·45**	*bx*
EU-130	**Adapter,** for collector flask and condenser.	Each	**£2·75**	*ax*
EU-132	**Idler wheel assembly**	Each	**£1·10**	*bx*
Q-C3/13	**Condenser,** effective area approx. 230 cm²	For prices see entries in List No. sequence.		
Q-MF10/3	**Vacuum adapter** for Q-C3/13			
Q-FR500/35	**Collector flask,** 500 ml			
JR-260	**Clip** for spherical joints S29			
SM-670	**Clamp,** 35 mm, for condenser			
SM-636	**Bosshead** for SM-670			
SM-488	**Allen key** for SM-636			

ACCESSORIES

EU-140	**Cone-to-cone adapter.** Requires but does not include joint clip EU-126	Each	**£1·50**	*ax*
Q-FR250/3S to **Q-FR1L/3S**	**Flasks,** socket neck	For prices see entries in *Quickfit* section.		
Q-CX6/33	**Condenser,** effective area approx. 400 cm²			

- **For evaporation under vacuum with gentle heating applied where necessary**
- **Especially useful with heat-sensitive materials**
- **Rapid distillation occurs at temperatures well below normal boiling points**
- **Suitable for batch and semi-continuous operation**
- **Optional assemblies—distillate collected or run to waste**
- **Typical distillation rate—190 ml water per hour at 40°C and 25 torr pressure**
- **Applications in Pharmacology, Biochemistry, Preparative Chemistry, Explosives Chemistry and Nutritional Studies**

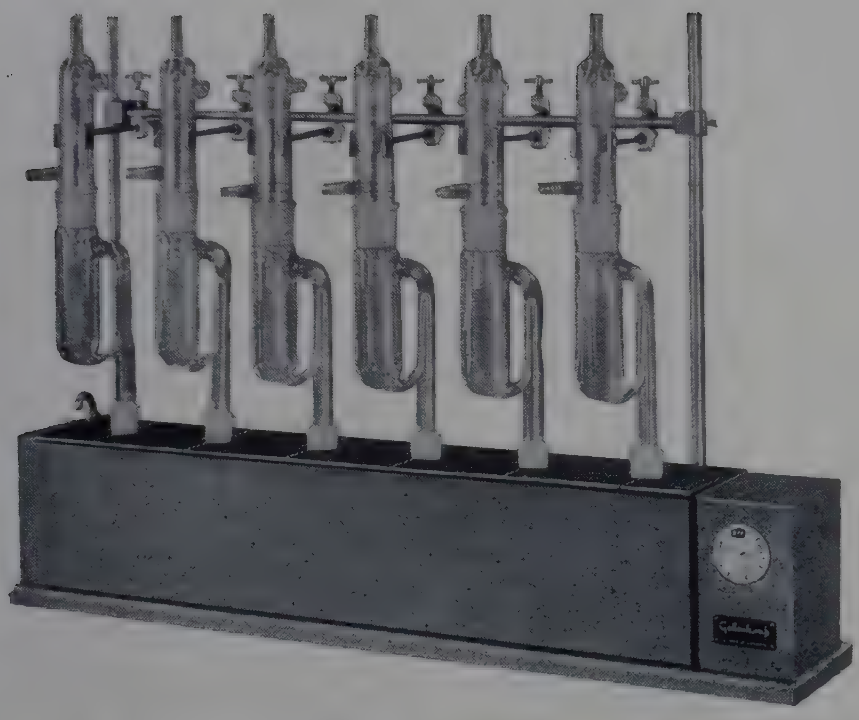


EU-105

VACUUM PUMPS — FD-215 et seq, VB-042 et seq
WATER BATHS — WF-360 et seq
RECEIVER SUPPORT — SM-360

For details see entries in List No. sequence.

Gallenkamp WATER BATH FOR SOXHLET EXTRACTIONS



EV-100 with six extraction apparatus EV-285 and clamps

EV-100

WATER BATH, Soxhlet, *Gallenkamp*, **stainless steel,** to take six flasks up to 500 ml capacity. This bath, overall dimensions 18 × 85 × 16·5 cm high, has a sectional top cover for easy access to individual flasks. The base supports two duralumin rods, extending 60 cm above the bath top, carrying an adjustable horizontal rod. The flasks are supported by a shelf covering the 1 kW tubular immersion element which extends practically the whole length of the bath for uniform heating. The control compartment houses an energy regulator for temperature control. With built-in constant level device and mains cable but **without glassware, condenser clamps and bossheads.**

For 220/240V a.c. single phase supplies...	Each	**£91·00**	*bx*
For 200/210V a.c. single phase supplies...	Each	**£91·50**	*bxN*
For 110/120V a.c. single phase supplies...	Each	**£91·50**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

EV-102 **Immersion element,** 1 kW, single loop. Each £5·50 *bx*

ACCESSORIES

SM-670 **Spring clamps,** for condensers.

Diameter	35	40 mm
For condenser	CU-520 CU-530 joint 40/38	CU-530 joint 50/42

SM-636 **Bosshead,** to mount spring clamp on horizontal rod of EV-100.

For details and prices see entries in List No. sequence.

For suitable glassware see page 221

AIR BATHS FOR SOXHLET EXTRACTIONS

EV-152 and EV-154

Designed for flasks of 100/150 and 200/350 ml capacity. Heated by coiled-coil nickel-chromium elements supported by knitted glass fabric very close to the flasks. Heat losses are minimised by glass wool insulation. Temperature is accurately controlled by built-in energy regulators, one for each flask position.

Overall width 25 cm; length of 3-position baths 66 cm, length of 6-position baths 117 cm.

For 200/250 or 100/130V single phase a.c. supplies.

AIR BATHS, *Electrothermal*, as specification. With support rods but **without glassware, condenser clamps and bossheads.**

List No.	Ref. No.	Flasks No. × ml	Watts at 250V	Each	
				£	
EV-146	ME437	3 × 200/350	450	**57·40**	*fxN*
EV-152	ME466	6 × 100/150	600	**90·00**	*fx*
EV-154	ME467	6 × 200/350	900	**95·10**	*fx*

When ordering please state voltage and frequency of supply.

SOXHLET EXTRACTORS

Regd.

EV-280

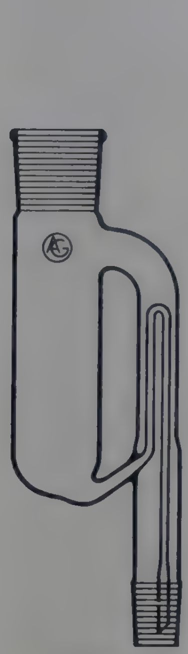
EXTRACTORS, Soxhlet type (AG) improved pattern. Regd. Design No. 911418. A compact extractor in which the siphon tube is protected by being enclosed within the vapour tube. Reduces breakage and permits very high boiling rates due to large diameter of vapour tube. The siphon operates reliably with water or organic solvents at all normal rates of extraction.

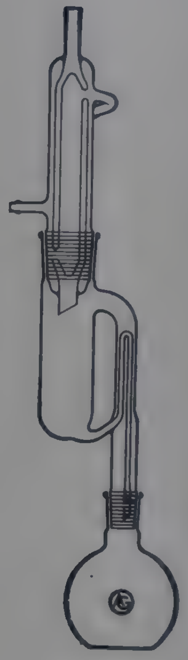
Extractor capacity	40	100	200 ml	
Cone	24/29	24/29	29/32	
Socket	29/32	40/38	50/42	
To take thimble size	22 × 80	30 × 100	41 × 123 mm	
Ten	**£32·00**	**41·00**	**49·00**	*ax*
Each	**£ 3·60**	**4·60**	**5·50**	

EV-285

EXTRACTION APPARATUS, Soxhlet, (AG). Each assembly comprises extractor EV-280 with flask FJ-110 and Davies double surface condenser. On the two larger sizes the cone joint of the condenser forms the lower end of the water jacket, making a compact and convenient extraction combination.

Extractor	40	100	200 ml	
Flask capacity	150	250	500 ml	
Flask socket	24/29	24/29	29/32	
Condenser cone	29/32	40/38	50/42	
Condenser List No.	CU-520	CU-530	CU-530	
Condenser jacket length	15	20	20 cm	
6 sets	**£41·00**	**47·00**	**54·00**	*ax*
Set	**£ 7·40**	**8·40**	**9·30**	


EV-280


EV-285

SINTAGLASS EXTRACTION THIMBLES

EXTRACTION THIMBLES, *SintAGlass,* borosilicate glass. Made entirely from sintered glass. Mechanically strong, having a wall thickness of 2 to 3 mm, and can be handled when wet. For most purposes they can be used instead of paper thimbles, the initial cost being offset by repeated use.

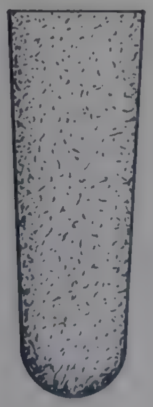
Nominal size	22 × 80	30 × 100	41 × 123 mm	
Suitable for extractors:				
EV-280/285 size	40	100	200 ml	
Quickfit	Q-EX5/43	Q-EX5/63	Q-EX5/83	
Porosity, approx		List Numbers		
1	**EV-391**	**EV-401**	**EV-411**	
3	**EV-393**	**EV-403**	**EV-413**	
Ten	**£15·50**	**19·00**	**20·50**	*ax*
Each	**£ 1·75**	**2·15**	**2·30**	

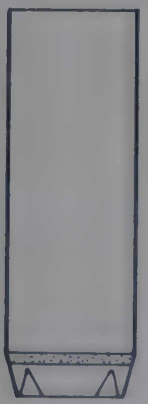
EXTRACTION THIMBLES, *SintAGlass,* borosilicate glass, with sintered plate fused into a glass tube. Can be heated in a furnace up to about 500°C and dried to constant weight in an oven.

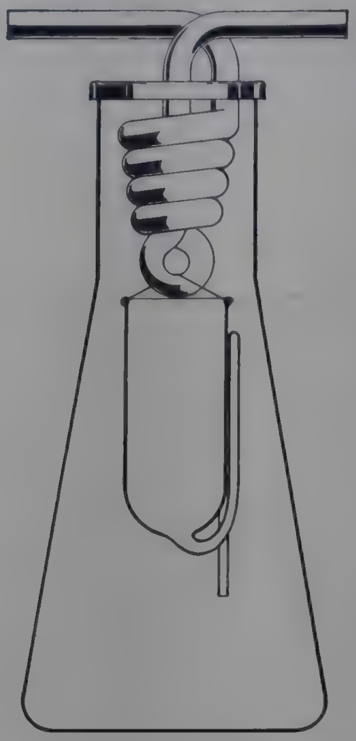
Nominal size	22 × 80	30 × 100	41 × 123 mm	
Plate diameter	20	30	40 mm	
Height above plate	75	95	110 mm	
Suitable for extractors:				
EV-280/285 size	40	100	200 ml	
Porosity		List Numbers		
1	**EV-421**	**EV-431**	**EV-441**	
2	**EV-422**	**EV-432**	—	
3	—	**EV-433**	—	
Ten	**£6·40**	**7·00**	**10·60**	*ax*
Each	**£0·72**	**0·78**	**1·18**	

For details of ignition and drying procedure see page 148.

For full details of porosity ranges, colour coding and other useful information see data under page heading Sintered Glassware.


EV-391 to EV-413


EV-421 to EV-441



EV-570 with EV-575 and EV-580

Asphaltenes precipitation by **extraction** to IP 143—see PF-140 in List No. sequence.

Sediment in crude and fuel oils by **extraction** to ASTM D473—IP 53—see PF-960 to PF-965 in List No. sequence.

Gallenkamp

FLASK SHAKER

suitable for extraction and many other applications.

- **For up to six 500 ml flasks**

Gallenkamp
FLASK SHAKER

For full details and price see SD-110 in List No. sequence.

EV-450

EXTRACTION THIMBLES, *Whatman*, fat-free paper, seamless. Single thickness. In boxes of 25.

EV-452

EXTRACTION THIMBLES, *Whatman*, as EV-450 but double thickness.

List No.	**EV-450**	**EV-452**		**EV-450**	**EV-452**	
Size mm	Box of 25		Size mm	Box of 25		
	£	£		£	£	
10 × 50	**0·83**	—	28 × 120	**1·41**	—	*mx*
19 × 90	**1·02**	—	30 × 100	**1·35**	**2·23**	*mx*
22 × 80	**1·00**	**1·63**	33 × 80	**1·36**	**2·23**	*mx*
25 × 80	**1·00**	—	33 × 100	**1·63**	—	*mx*
25 × 100	**1·11**	**1·83**	33 × 118	**1·83**	—	*mx*
26 × 60	**1·16**	—	41 × 123	**2·25**	—	*mx*

EV-570

EXTRACTION FLASK, conical, *Pyrex* glass. Suitable for rubber analysis to ASTM D297 when used with accessories listed below. Capacity 400 ml.
Std. pack of 6 **£2·10** Each **£0·40** *jx*

ACCESSORIES

***EV-575** **Condenser,** tin spiral, to fit neck of flasks EV-570.
Each **£7·50** *cx*

EV-580 **Siphon cup,** borosilicate glass, with two suspension holes. Approximately 28 mm int. dia. and 65 mm long.
Each **£0·60** *ax*

Suitable **extraction thimbles** see EV-450 and EV-452.

EXTRACTION APPARATUS, for the determination of the acetone extract value of solid unvulcanised natural rubber, to BS 903 and BS 1673 Part 2. The joint sizes of components shown in the specifications are not mandatory and alternative assemblies are possible from *Quickfit* components. The following assemblies are suggested.

Extractor cup capacity	20	50 ml
Condenser	Q-CX 3/05	Q-CX 3/07
Extractor body	Q-EX 7/13	Q-EX 7/23
Extractor cup	Q-EX 7/10	Q-EX 7/20
Flask	Q-FF 150/3S	Q-FF 250/3S

For prices and details of above components see entries under QUICKFIT APPARATUS.

Quickfit **extraction apparatus, see QUICKFIT APPARATUS**

WHATMAN FILTER PAPERS

EXPLANATION OF GRADES

Qualitative grades, Nos. GP, 1, 2, 3, 4 and 6. For filtration purposes where a low ash content is not required.

GP	is a schools grade paper in circles up to 18·5 cm.
No. 1	is the most widely used of all general laboratory filtrations and qualitative analysis.
No. 6	is a smooth high retention paper.

Folded papers, No. 2V.

No. 2V is a No. 2 grade paper folded ready for use.

Low ash grades, Nos. 30, 31 and 32. These papers are suitable for gravimetric analysis, where the lowest ash content is not necessary.

No. 30 is the standard paper for rough quantitative work.

Ashless grades, Nos. 40, 41, 42 and 44. These papers are for use in accurate gravimetric analysis.

No. 40 with medium retention and filtration speed, is the general purpose paper for gravimetric work.

Hardened grades, Nos. 50, 52 and 54. These papers have great wet strength and resistance to acid and alkali solutions, but do not contain any synthetic wet-strengthening resins. The hard smooth surface allows the removal of fine precipitates from the paper, particularly after suction filtration, by scraping or vigorous washing.

No. 50	is a very smooth surfaced paper which may be used when the removal of slimy biological suspensions from the paper after filtration is necessary.
No. 52	with medium retention and filtration speed, is the general purpose hardened grade.
No. 54	is an open-textured filter paper which may be used in filter presses as a pre-filter to remove coarse particles prior to filtration through a sterilising mat, or as an after-filter to prevent fibres from the sterilising mat passing into the filtrate.

Hardened, ashless grades, Nos. 540, 541 and 542. These papers, with very low ash content, correspond to the standard ashless grades, but the hardening process makes them particularly useful for gravimetric analysis in which strong acid or alkaline solutions are used.

High wet-strength grade, No. 90. This paper contains a small amount of a stable additive to impart a high wet strength, unlike the hardened grades which are chemically treated and contain no binders. The presence of additive is rarely significant except when accurate determination of nitrogen is involved.

Specialities include ashless tablets, ashless floc, phase separating paper, agar-agar papers and several grades of glass fibre filter.

WEIGHTS OF PAPER AND ASH

Grade No.	Weight g/100 cm^2	Ash (average) %	Ash (average) mg/100 cm^2
1	0·87	0·06	0·52
2	0·97	0·06	0·58
3	1·85	0·05	0·92
4	0·92	0·06	0·55
6	1·00	0·06	0·60
30	0·95	0·025	0·24
31	0·91	0·025	0·23
32	1·00	0·025	0·25
40	0·95	0·01	0·09
41	0·91	0·01	0·09
42	1·00	0·01	0·10
44	0·80	0·01	0·08
50	1·00	0·025	0·25
52	1·00	0·025	0·25
54	0·93	0·025	0·23
90	1·00	0·06	0·60
540	0·88	0·008	0·07
541	0·82	0·008	0·06
542	1·00	0·008	0·08

RELATIVE FILTRATION RATES, RETENTIVITY AND PORE SIZES

Classification	Fast			Fast-Medium	Medium	Slow	
Retaining properties	Coarse particles			Medium particles		Fine particles	
Mean pore size, microns	5·0 to 3·4			2·8 to 2·1	2·9 to 1·4	1·1 to 0·4	
Relative filtration times	4–5	6–8	9–12	20–30	35–50	100–130	140–160
Qualitative grades		4		1	2, 3		6
Qualitative wet strength grade	90						
Low ash grades			31		30	32	
Ashless grades			41		40	44	42
Hardened grades		54			52		50
Hardened ashless grades		541			540		542

For prices see overleaf

WHATMAN FILTER PAPERS

PACKAGING

All filter papers sizes 4·25 to 50·0 cm listed below are packed in boxes of 100 circles. The 46 × 57 cm sheets are in packs of 100.

List No.		FC-200	FC-205	FC-207	FC-210	FC-220	FC-230	FC-240	FC-245	FC-250	FC-255	
cm	Grade	1	2	2V	3	4	6	30	31	32	40	
Circle dia.	Qty.	£	£	£	£	£	£	£	£	£	£	
4·25	10 boxes	0·50	—	—	—	—	—	—	—	—	—	mx
	Box	0·13	—	—	—	—	—	—	—	—	—	
5·5	10 boxes	0·70	—	—	—	—	—	—	—	—	—	mx
	Box	0·14	—	—	—	—	—	—	—	—	—	
7·0	10 boxes	0·80	—	—	—	1·00	—	—	—	—	3·00	mx
	Box	0·15	—	—	—	0·17	—	—	—	—	0·36	
9·0	10 boxes	1·20	1·40	—	2·50	1·40	1·40	2·70	2·70	2·70	4·30	mx
	Box	0·19	0·21	—	0·31	0·21	0·21	0·33	0·33	0·33	0·48	
11·0	10 boxes	1·50	1·90	—	3·30	1·90	1·90	3·60	3·60	3·60	5·30	mx
	Box	0·22	0·25	—	0·39	0·25	0·25	0·42	0·42	0·42	0·59	
12·5	10 boxes	1·80	2·40	4·90	4·00	2·40	2·40	4·30	4·30	4·30	6·40	mx
	Box	0·25	0·30	0·54	0·45	0·30	0·30	0·48	0·48	0·48	0·72	
15·0	10 boxes	2·30	3·10	6·10	5·50	3·10	3·10	6·10	6·10	6·10	7·70	mx
	Box	0·30	0·37	0·70	0·60	0·37	0·37	0·70	0·70	0·70	0·86	
18·5	10 boxes	3·60	4·50	8·00	8·60	4·50	4·50	9·20	9·20	9·20	11·10	mx
	Box	0·42	0·50	0·90	0·96	0·50	0·50	1·02	1·02	1·02	1·25	
24·0	Box	0·59	0·73	1·19	1·39	0·73	0·73	—	—	—	1·77	mx
32·0	Box	1·05	1·37	1·95	2·50	1·37	1·37	—	—	—	—	mx
40·0	Box	1·73	2·12	2·78	—	—	—	—	—	—	—	mx
50·0	Box	2·56	3·23	3·89	—	—	—	—	—	—	—	mx
Sheets 46 × 57	Pack	2·15	2·89	—	5·56	2·89	2·89	—	—	—	—	mx

For *Whatman* G.P. grade—see FC-500 on opposite page.

For *Whatman* No. 1 grade semi-micro circles—see FC-504 on opposite page.

List No.		FC-260	FC-265	FC-275	FC-280	FC-290	FC-295	FC-296	FC-300	FC-305	FC-310	
Circle dia. cm	Grade	41	42	44	50	52	54	90	540	541	542	
	Qty.	£	£	£	£	£	£	£	£	£	£	
7·0	10 boxes	3·00	3·00	3·00	2·50	2·50	2·50	—	3·00	3·00	3·00	mx
	Box	0·36	0·36	0·36	0·31	0·31	0·31	—	0·36	0·36	0·36	
9·0	10 boxes	4·30	4·30	4·30	3·70	3·70	3·70	—	4·30	4·30	4·30	mx
	Box	0·48	0·48	0·48	0·43	0·43	0·43	—	0·48	0·48	0·48	
11·0	10 boxes	5·30	5·30	5·30	4·70	4·70	4·70	—	5·30	5·30	5·30	mx
	Box	0·59	0·59	0·59	0·52	0·52	0·52	—	0·59	0·59	0·59	
12·5	Box	0·64	0·64	0·64	0·55	0·55	0·55	0·36	0·64	0·64	0·64	mx
15·0	Box	0·77	0·77	0·77	0·71	0·71	0·71	0·47	0·77	0·77	0·77	mx
18·5	Box	1·11	1·11	1·11	1·02	1·02	1·02	0·68	1·11	1·11	1·11	mx
24·0	Box	1·77	1·77	—	—	—	—	—	1·77	1·77	1·77	mx

For *Whatman* specialities—see opposite page.

WHATMAN PAPERS (*Contd.*)

FC-500

FILTER PAPERS, *Whatman,* **G.P.** Schools grade, in pack of 200 circles.

Diameter	9	11	12·5	15	18·5	24 cm	
10 packs	**£1·40**	**1·70**	**2·00**	**2·50**	**3·60**	**5·20**	*mx*
Pack	**£0·21**	**0·24**	**0·27**	**0·31**	**0·42**	**0·58**	

FC-504

FILTER PAPERS, *Whatman,* **No. 1 semi-micro** circles. In boxes of 400 circles.

Diameter	2·1	2·5 cm	
10 boxes	**1·70**	**1·80**	*mx*
Box	**£0·24**	**0·25**	

FC-515

FILTER PAPERS, FOLDED, *Whatman,* **Agar.** For agar-agar filtration. In box of 50 folded squares.

Dimensions	32×32	50×50 cm	
Box	**£1·83**	**1·83**	*mx*

FC-520

PHASE SEPARATING PAPER, *Whatman,* **No. 1PS,** for separating aqueous solutions from water immiscible solvents. Used folded in a conical funnel, the paper retains the aqueous phase. Unsuitable for vacuum filtration or where the surface tension of the aqueous phase is reduced by alcohols or wetting agents. In boxes of 100 circles.

Diameter	7	9	11	12·5	15	18·5 cm	
Box	**£0·32**	**0·46**	**0·70**	**0·92**	**1·25**	**1·76**	*mx*

WHATMAN SPECIALITIES

FC-530

ASHLESS TABLETS, *Whatman.* Made from ashless material, each tablet 3·85 cm dia., with approximate weight 2·4 g and ash content approximately 3 mg. Easily dispersed in water. Used for large scale filtration of gelatinous precipitates, or where a bulk supply of filter aids is necessary for a batch of small scale precipitations. Supplied in tubes of 50 tablets.

5 tubes **£1·90** Tube **£0·42** *mx*

FC-540

ASHLESS FLOC, *Whatman,* for use as a filter aid or for preparation of filter pulp beds in conical or Buchner funnels. The floc resembles dry dispersed pulp and is supplied in pack of 100 g ... ... Pack **£0·36** *mx*

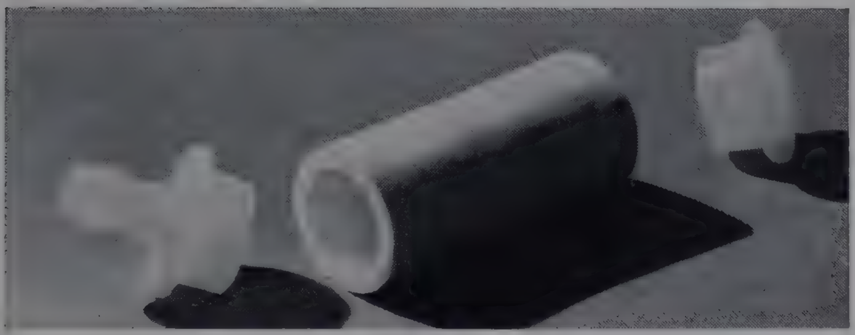
FC-570

FILTER PAPER CLIPPINGS, *Whatman,* 'Ordinary'. In pack of 500 g ... ... Pack **£0·30** *mx*

FC-575

FILTER PAPER CLIPPINGS, *Whatman,* 'Ashless'. In pack of 500 g ... ... Pack **£0·74** *mx*

WHATMAN GLASS FIBRE FILTERS



FC-640
FC-642

FILTER TUBES

For filtration and clarification of bulk quantities of liquids in bottles or carboys. Made of resin reinforced glass fibres resistant to most laboratory reagents up to 160°C. Provide 98% retention of 2μm particles. Supplied in packs containing ten tubes complete with two each polypropylene end cap and tubing connector.

List No.		FC-640	FC-642	
Size No.		A1	B2	
Diameter, external	mm	15	25	
internal	mm	12	19	
Length	mm	60	60	
Flow rate, water with 150 torr suction,	litres/min	>0·7	>1·4	
Average capacity solids before clogging,	mg	50	200	
Pack		**£1·28**	**£2·22**	*mx*

FILTER CIRCLES

These circles, made of fine borosilicate glass fibres, are extremely retentive, have great wet strength and are much faster than most cellulose papers. As the circles contain no binder or cellulose they will withstand most laboratory reagents and can be heated to 500°C.

FC-650

FILTER CIRCLES, GLASS FIBRE, *Whatman,* **GF/A.** Made from glass fibres of 0·5 μm dia. A very fast, thin filter, about 0·2 mm thick, with very high retention properties. In box containing 100 circles.

FC-660

FILTER CIRCLES, GLASS FIBRE, *Whatman,* **GF/B.** Made from glass fibres of 0·5 μm dia. The filter is about 0·65 mm thick, and therefore not so fast as FC-650, but more retentive. In box containing 100 circles.

FC-670

FILTER CIRCLES, GLASS FIBRE, *Whatman,* **GF/C.** Made from glass fibres of less than 0·5 μm dia. An ultra-fine filter of thickness about 0·2 mm, with retention properties greater than FC-660. In box containing 100 circles.

List No.	FC-650	FC-660	FC-670	
Grade	GF/A	GF/B	GF/C	
Dia. cm	Box	Box	Box	
	£	£	£	
2·1	**0·50**	**0·67**	**0·55**	*mx*
2·5	**0·50**	**0·67**	**0·55**	*mx*
4·25	**0·61**	**1·00**	**0·72**	*mx*
5·5	**0·72**	**1·28**	**0·94**	*mx*
7·0	**0·84**	**1·78**	**1·11**	*mx*
9·0	**1·11**	**2·56**	**1·67**	*mx*
11·0	**1·50**	**3·23**	**2·30**	*mx*
12·5	**1·73**	**4·50**	**2·94**	*mx*

Gallenkamp METAL FILTER PUMPS

FD-210

FD-210

FILTER PUMP, *Gallenkamp*, nickel plated brass. With a water supply at 1·75 kgf/cm² (25 lbf/in²) the pump requires about 6 litres of water in approx. 100 sec to evacuate a 1 litre system to a vacuum of about 200 torr. For efficient operation a tail pipe should be used on the water outlet with the open end immersed in water. Overall length 12 cm. With water inlet nozzle for 10 mm bore pressure tubing connection to tap, water outlet for 8 mm bore tubing and vacuum nozzle for 8 mm bore tubing ... ... Ten **£16·00** Each **£1·80** *bx*

FD-215 with FD-216

FD-215

FILTER PUMP, *Gallenkamp*, **high efficiency, chromium plated.** The water passes through a polypropylene nozzle into a small cavity where an annular space between the water jet and the cavity wall forms a low pressure region. This annular space, compared with the small area of the side arm in traditional pumps, provides the pump with its greatly enhanced efficiency. The water then proceeds through a venturi and finally to the vortex cavity and off-set outlet which ensures that the venturi remains full and so eliminates the need for an immersed tail pipe on the water outlet. An efficient non-return valve is fitted in the vacuum connection. Using a water supply at 1·75 kgf/cm² (25 lbf/in²) pressure, the pump requires only 3·5 litres of water in approx. 40 seconds to evacuate a 1 litre system to about 150 torr. Overall length 20 cm. With water inlet nozzle for 10 mm bore pressure tubing and vacuum nozzle for 8 mm bore tubing. Ten **£26·00** Each **£2·90** *bx*

ACCESSORY

FD-216 **Wing nut adapter** for connection to water taps with ½ in BSP thread male outlets. Comprises insert with wing nut and washer. Ten **£7·00** Each **£0·78** *bx*

REPLACEMENT PART

FD-217 **Spares kit** comprising 3 neoprene inserts for non-return valve and 12 neoprene washers for wing nut adapter ... ... Each **£0·65** *bx*

FILTRATION MATERIALS

Asbestos fibre	see AR-460
Glass fibre	see GR-150
Nylon gauze	see GK-150
Porous polythene	see PP-630

For details see entries in List No. sequence.

FILTER CRUCIBLES,		
	Sintaglass,	see CW-481 et seq.
	Gooch	see CW-550 et seq.
FILTER FLASKS,		
	Buchner	see FJ-280 and FJ-290
FILTER FUNNELS,		
	Buchner	see FM-601 et seq. and FP-460 et seq.

For details see entries in List No. sequence.

FILTER PUMPS AND ACCESSORIES
(continued)

FD-218

FILTER PUMP, glass, with rubber non-return valve. For use with 10 mm bore pressure tubing for connection to tap, 8 mm bore tubing for vacuum outlet and 10 mm bore tubing for an immersed tail pipe.
Std. pack of 6 **£7·92** Each **£1·45** *jx*

FD-220

FILTER PUMP, *Edwards*, nylon, with integral non-return valve. For use with 13 mm bore pressure tubing for connection to tap, 8 mm bore tubing for vacuum outlet and 10 mm bore tubing for an immersed tail pipe.
Each **£1·68** *mx*

FD-235

FILTER PUMP, *Edwards*, Model 7, stainless steel with combined ¼ in male BSP and tubing connector. An integral non-return valve is fitted. For use with 13 mm bore pressure tubing for connection to tap, 8 mm bore tubing for vacuum outlet and 10 mm bore tubing for an immersed tail pipe ... ... Each **£3·84** *fx*

FD-237

FILTER PUMP, *Edwards*, Model 8. As FD-235 but with ¼ in female BSP thread ... ... Each **£3·84** *fx*

REPLACEMENT PART

FD-239 **Valve inserts,** for pumps FD-235 and FD-237.
Pack of 3 **£0·75** *fx*

ACCESSORY

FD-240 **Vacuum gauge,** with attachment for use with pumps FD-235, FD-237, scale 0–760 mm, 0–30 in Hg.
Each **£3·73** *fx*

VACUUM GAUGES and stands, suitable for use with filter pumps, see GAUGES.

FD-251

FILTER PUMP, electrically operated. A reciprocating diaphragm pump with polypropylene body, neoprene diaphragm and silicone rubber valve, driven by a totally enclosed motor with integral fan cooling and on anti-vibration mountings. The whole is enclosed in a louvred metal case with inlet and exhaust nozzles for 8 mm bore flexible tubing and mains connecting cable. Vacuum 150 torr. Pressure 1·4 kgf/cm². Provides adequate suction for most laboratory filtration purposes with the advantage that the pump is made of relatively chemical resistant materials. For 230/250V a.c. supplies only.
Each **£25·00** *fx*

REPLACEMENT PART

FD-253 **Replacement parts kit** comprising two pump head filters, two transfer valves, diaphragm and clamp plate.
Kit **£1·00** *fx*

***FD-255**

NON-RETURN VALVE, polypropylene, for use with filter pumps. With corrugated ends for 8 mm bore vacuum tubing connection.
Ten **£3·20** Each **£0·38** *mx*

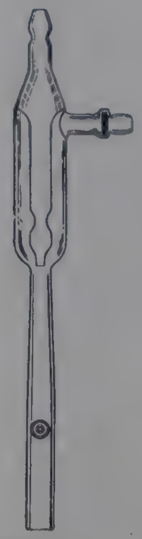
***FD-260**

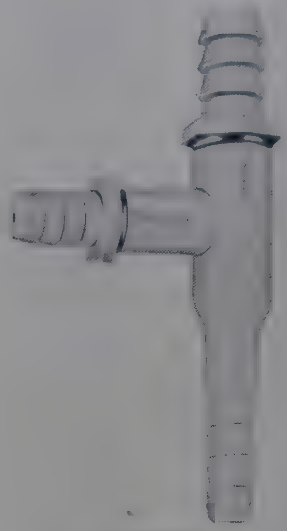
AIR INLET VALVE, for vacuum systems, plastics, with corrugated ends for 8 mm bore vacuum tubing connection.
Ten **£5·60** Each **£0·62** *cx*

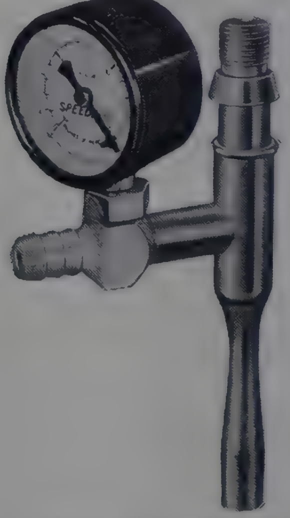
FLEXIBLE TUBING
for filter pump connections

Water inlet — TX-625 or TX-778
Vacuum outlet — TX-525 or TX-755
Tail pipe — TX-520

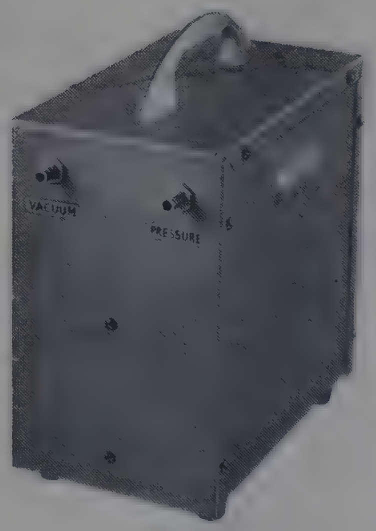
For details and prices see entries in List No. sequence.


FD-218


FD-220



FD-235 with FD-240



FD-251

FD-255

FD-260

Gallenkamp MEMBRANE FILTER HOLDERS

FOR BACTERIOLOGICAL FILTRATION

Widely used to filter liquids for the separation or examination and analysis of particulate and biological matter.

Typical fields of application include:

- **Water, sewage and marine biology.**
- **Dairy products.**
- **Sugar and allied foodstuffs.**
- **Bacteriology, virology and mycology.**
- **Antibiotics and disinfectants.**
- **Beers, wines and soft drinks.**
- **Clinical fluids including blood, urine, spinal fluids and gastric and pleural washings.**

FD-300

FD-305

FD-310

A range of membrane holders which are easily assembled and efficient in use.

The membrane which rests on a sintered glass bed is clamped between silicone rubber gaskets by hand tightening a locking collar on the filter body. A sintered bronze bed is available as an accessory.

All metal parts are of stainless steel and the locking collar, which does not come into contact with the filtering liquid, is of polypropylene. The components may be sterilised by autoclaving at 121°C (1·05 kgf/cm^2) and the holder may be loosely assembled with the membrane in position during this process.

FD-300

FILTER HOLDER, *Gallenkamp*, as specification, for **gravity or vacuum filtration.** Accepts 47 mm dia. and 50 mm dia. membranes. With cylindrical funnel top having capacity marks at 50 and 100 ml. **Without membranes.**
Ten **£64·00** Each **£7·20** *bx*

FD-305

FILTER HOLDER, *Gallenkamp*, as specification, **for gravity or vacuum filtration.** Accepts 47 mm dia. and 50 mm dia. membranes. With conical funnel top, capacity approx. 500 ml. **Without membranes.**
Each **£12·60** *bx*

FD-310

FILTER HOLDER, *Gallenkamp*, as specification, **for pressure filtration.** Accepts 47 mm and 50 mm dia. membranes. With cylindrical top, capacity 100 ml, fitted with an 8 mm o.d. nozzle for pressure connection and a screw-on cap for filling and pressure release. **Without membranes** ... ... Each **£18·00** *bx*

ACCESSORY AND REPLACEMENT PARTS for FD-300, FD-305 and FD-310

FD-314	**Support bed,** sintered bronze	Each	**£0·60**	*bx*
FD-316	**Support bed,** sintered glass	Each	**£0·50**	*bx*
FD-318	**Gaskets,** silicone rubber	Pair	**£0·45**	*bx*
FD-324	**Funnel top, cylindrical,** capacity 100 ml, **with locking collar**	Each	**£2·20**	*bx*
FD-326	**Funnel top, conical,** capacity 500 ml, **with locking collar**	Each	**£8·40**	*bx*
FD-328	**Funnel top, pressure,** capacity 100 ml, **with locking collar**	Each	**£13·60**	*bx*
FD-415	**Filter membranes** ...	For details and prices see entries in List No. sequence.		
FJ-280	**Filter flasks**			

CONVERSION OF FILTER HOLDERS

By selecting the appropriate funnel top as listed above a filter holder can be converted into either of the other models.

To convert	into	use
FD-300	**FD-305**	**FD-326**
	FD-310	**FD-328**
FD-305	**FD-300**	**FD-324**
	FD-310	**FD-328**
FD-310	**FD-300**	**FD-324**
	FD-305	**FD-326**

Regd.

ALL-GLASS MEMBRANE FILTER HOLDERS

FOR BACTERIOLOGICAL FILTRATION

These filter holders are made from borosilicate glass and are easily cleaned and sterilised.

The filter body is available with either 24/29 or 29/32 standard cone joint, with drip end to deliver below the level of the side tube of the Buchner flask with which it is used.

The selected membrane is supported on a flat ground sintered glass disk. The membrane is clamped between glass flanges held together by a three screw ring clamp. The clamp is so designed that the two halves of the holder are easily assembled and separated.

FD-390

FILTER HOLDER, (AG), as specification, **all-glass, for gravity or vacuum filtration.** Accepts 47 or 50 mm dia. membranes. Comprises funnel top 8·5 cm dia., capacity approx. 300 ml, ring clamp and filter body with sintered glass disk and 24/29 drip ended ground cone. **Without membranes** ... ... Each **£15·50** *bx*

FD-392

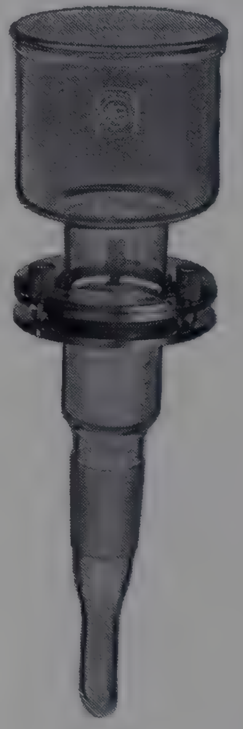
FILTER HOLDER, as FD-390 but with 29/32 cone. Each **£15·50** *bx*

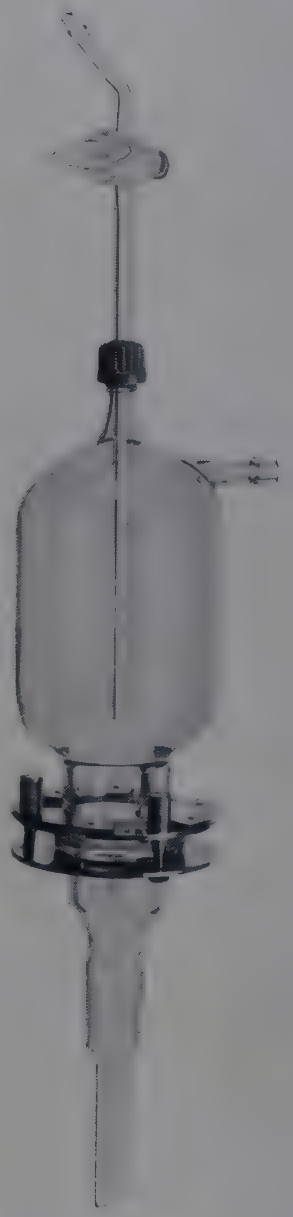
FD-394

FILTER HOLDER, (AG), as specification, **all-glass, for pressure filtration.** Accepts 47 or 50 mm dia. membranes. Comprises heavy wall pressure top 8 cm dia., capacity approx. 300 ml, pressure connection nozzle, filtrant inlet tube, flow control stopcock, ring clamp and filter body with sintered glass disk and 24/29 drip ended ground cone. All nozzles accept 8 mm bore flexible tubing. **Without membranes** ... ... Each **£19·00** *bx*

FD-396

FILTER HOLDER, as FD-394 but with 29/32 cone. Each **£19·00** *bx*


FD-390


FD-394

REPLACEMENT PARTS

FD-400	**Funnel top,** borosilicate glass	Each	**£4·10**	*ax*
FD-402	**Pressure top,** borosilicate glass with SQ13 screw joint but without inlet tube	Each	**£5·25**	*ax*
FD-403	**Inlet tube** to fit screw joint of FD-402.	Each	**£2·00**	*ax*
FD-404	**Filter body** with sintered plate and 24/29 cone joint.	Each	**£6·65**	*ax*
FD-406	**Filter body** with sintered plate and 29/32 cone joint.	Each	**£6·65**	*ax*

Q-QC13/7	**Screw cap**	For details and prices see QUICKFIT APPARATUS.
Q-QR13/6	**Rubber ring**	
Q-QW13/6	**Ptfe washer**	

ACCESSORIES

FD-215	**Filter pump**	For details and prices see entries in List No. sequence.
FJ-290	**Filter flasks** with 29/32 socket and sidearm	

FILTER MEMBRANES

FD-415

FILTER MEMBRANES, *Oxoid*, cellulose ester. 47 mm dia. disks, 120 μm thick and having fine porous structures which provide for fast filtration rates. Printed with a grid of approx. 3·1 mm squares. Supplied in boxes of 100 disks.

Pore dia., maximum	0·22	0·47	0·80 μm	
Box	**£4·00**	**4·00**	**4·00**	*fx*

NOTE: Oxoid metal culture dishes, nutrient pads and prepared media are obtainable from Oxoid Ltd., Southwark Bridge Road, London, S.E.1.

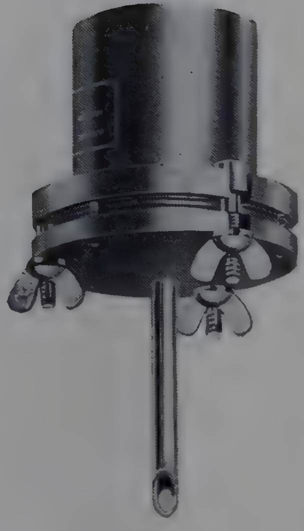
FILTER HOLDERS

FOR CLARIFICATION AND STERILISATION

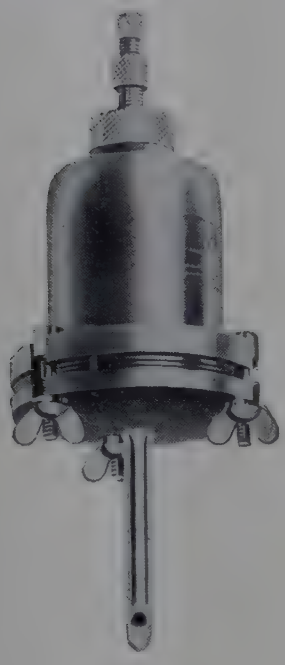
USING CARLSON-FORD FILTER SHEETS

METAL FILTER HOLDERS

Each filter holder is **made of brass, heavily silver-plated, and fitted with a silver-plated brass gauze** to support the filter sheet. The filter sheet forms the joint between the two halves of the filter and is pulled directly into position under an even pressure, thus ensuring a perfect seal.



FD-421
FD-426

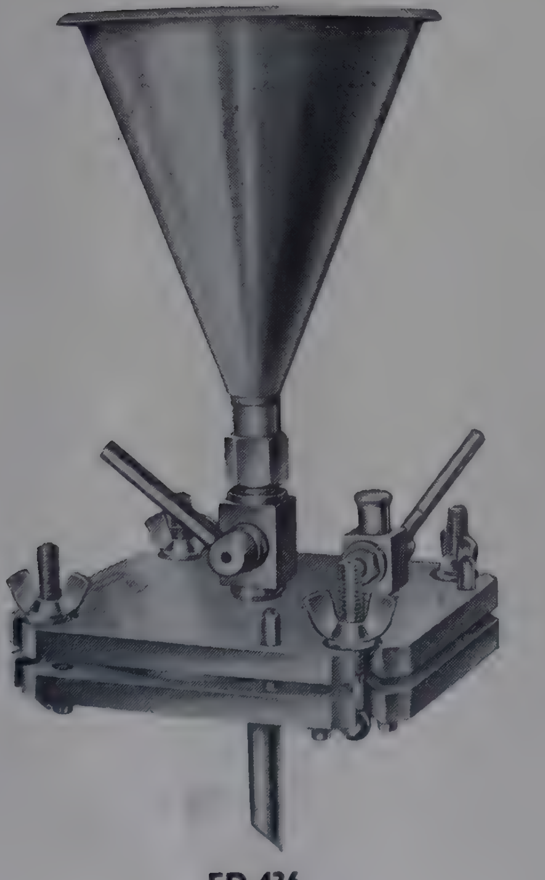


FD-431

FD-421
FILTER HOLDER, as specification, **for vacuum filtration.** Accepts 3·6 cm dia. filter sheets. With cylindrical funnel top, capacity 25 ml ... ... Each **£9·20** *fx*

FD-426
FILTER HOLDER, as specification, **for vacuum filtration.** Accepts 6 cm dia. filter sheets. With cylindrical funnel top, capacity 80 ml ... ... Each **£10·90** *fx*

FD-431
FILTER HOLDER, as specification, **for vacuum or pressure filtration.** Accepts 6 cm dia. filter sheets. With cylindrical pressure top, capacity 80 ml. Each **£15·05** *fx*



FD-436

FD-436
FILTER HOLDER, as specification, **for vacuum or pressure filtration.** Accepts 14 cm dia. filter sheets. With centre connection to take either an inlet pipe, or funnel of about 650 ml capacity. Complete with inlet pipe and 650 ml funnel ... ... Each **£65·00** *fx*

ACCESSORIES

FD-438 **Filter sheets,** *Carlson-Ford* Grade HP/EKS. In boxes of 25 circles.

Diameter	3·6	6	14 cm	
Box	£0·23	0·35	0·95	mx

FILTER SHEETS *Carlson-Ford* **Grade HP/EKS**

This is a high purity sterilising grade of asbestos filter sheets which removes deposits by absorption.

To ensure sterility, the filter holder with the sheet loosely in position should be autoclaved at 1·05 kgf/cm² steam pressure for 30 min. If steam is passed through the filter for this purpose, the static pressure **must not exceed 0·35 kgf/cm².**

The pressure difference between the inlet and the outlet side of the filter must be kept low, **and should not exceed 1·05 kgf/cm² when sterile filtration is required.**

FILTER HOLDERS

FOR CLARIFICATION AND STERILISATION

USING CARLSON-FORD FILTER SHEETS

AG
Regd.

GLASS FILTER HOLDERS

These filter holders are **made of glass with stainless steel disks.** Each is designed so that filtering liquids come in contact only with glass and a stainless steel perforated disk which supports the filter sheet. This eliminates contamination by toxic metals, which may occur with worn plated-metal filter holders. The disk, including the filtering holes, is polished to withstand corrosion, and fits in a recess in the lower part of the glass filter. The glass parts are held together by screws with milled heads, which require only finger-tightening.

FD-440

FILTER HOLDER, (AG), as specification, **for vacuum filtration.** Accepts 3·6 cm dia. filter sheets. With cylindrical funnel top, capacity approx. 20 ml.
Each **£4·80** *bx*

REPLACEMENT PARTS

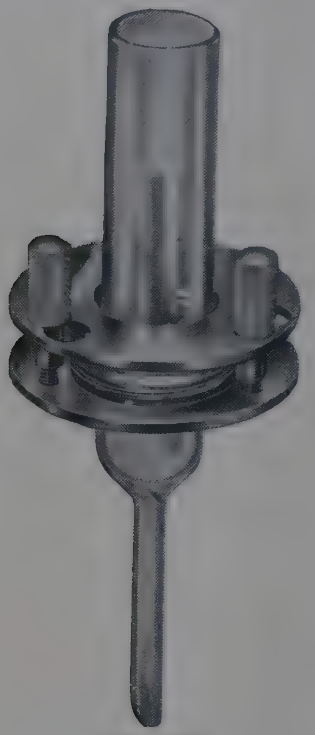
FD-442	**Glass lower part**	Each	**£0·95**	*ax*
FD-444	**Glass upper part**	Each	**£0·70**	*ax*
FD-438	**Filter sheets,** *Carlson-Ford*, grade HP/EKS, 3·6 cm dia. For prices see entry in List No. sequence.			

FD-450

FILTER HOLDER, (AG), as specification, **for vacuum filtration.** Accepts 6 cm dia. filter sheets. With cylindrical funnel top, capacity approx. 100 ml.
Each **£9·75** *bx*

REPLACEMENT PARTS

FD-452	**Glass lower part**	Each	**£1·70**	*ax*
FD-454	**Glass upper part**	Each	**£1·35**	*ax*
FD-438	**Filter sheets,** *Carlson-Ford*, grade HP/EKS, 6 cm dia. For prices see entry in List No. sequence.			



FD-440
FD-450

HEMMINGS FILTER HOLDERS

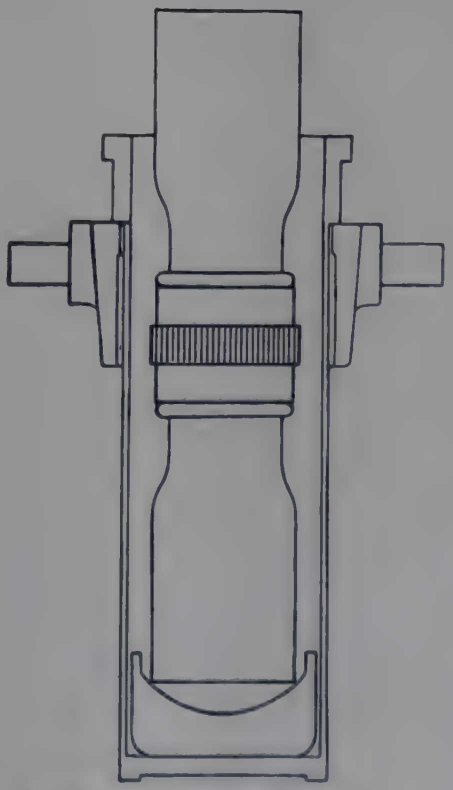
These filter holders are **made from chromium plated brass** and are used for clarification and sterilisation of small samples of biological fluids, when rapid filtration without heavy loss of material is required. They are normally used in pairs in a centrifuge with 50 ml buckets. In use each filter holder is fitted with two 7 ml screw cap bottles CX-200, one to contain the original sample and the other to act as the receiver. The liquid is filtered by 18 mm dia. filter sheets, and the product can be stored in the receiver bottle, thus minimising the risk of contamination. The filter holders are easily cleaned and assembled. Tests have shown that 4 ml of nutrient broth can be sterilised in each filter holder in 5 minutes, using a grade EKS sheet, and a centrifuge with appropriate head, rotating at 2300 rev/min.

FD-480

FILTER HOLDERS, Hemmings, as specification, **for use in a 50 ml centrifuge bucket.** Accepts 18 mm dia. filter sheets. **Without 7 ml capacity screw cap bottles** ... ... Pair **£4·00** *fx*

ACCESSORIES

FD-482	**Filter sheets,** *Carlson-Ford*, grade EKS, 18 mm dia. In pack of 200 sheets.	10 packs	**£11·10**	Pack	**£1·25**	*fx*
CF-405	**Centrifuge**	For details and prices see entries in List No. sequence.				
CX-200	**Screw cap bottles** ...					



FD-480 assembled with 7 ml bottles CX-200 in bucket of centrifuge

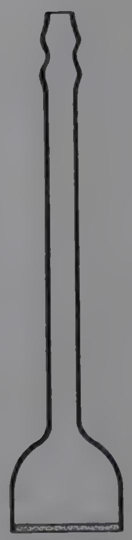
FD-480

SINTAGLASS FILTERS

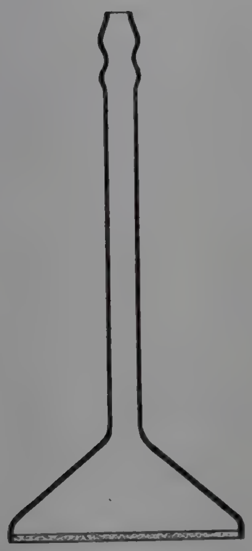
- Close tolerance porosity ranges
- Colour coded for porosity
- Non-friable sintered plates
- Made from borosilicate glass

For details of porosity ranges and colour coding see page 233.

For other useful information see data on pages headed Sintered Glassware.



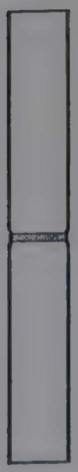
FD-502
FD-503



FD-512 to FD-523

IMMERSION FILTERS, *SintaGlass.* For use by immersion in the liquid to be filtered after allowing the precipitate to settle.

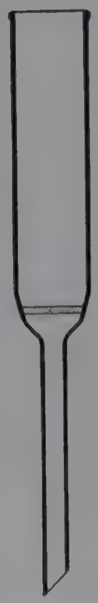
Plate diameter	30	65	90 mm	
Height above plate	110	110	125 mm	
Porosity	List Numbers			
2	**FD-502**	**FD-512**	**FD-522**	
3	**FD-503**	**FD-513**	**FD-523**	
Ten	**£10·00**	**17·50**	**33·00**	*ax*
Each	**£ 1·12**	**1·95**	**3·70**	



FD-530 to FD-564

FILTER TUBES, *SintaGlass,* comprising sintered plate sealed into the centre of a tube 150 mm long. Designed for assembling into special apparatus without the troublesome job of sealing-in the plate itself, an operation requireing special equipment and skill. Will seal to borosilicate glass with an expansion coefficient of $3{\cdot}2 \times 10^{-6}$.

Plate diameter	10	20	30	40 mm	
Porosity	List Numbers				
0	**FD-530**	**FD-540**	**FD-550**	**FD-560**	
1	**FD-531**	**FD-541**	**FD-551**	**FD-561**	
2	**FD-532**	**FD-542**	**FD-552**	**FD-562**	
3	**FD-533**	**FD-543**	**FD-553**	**FD-563**	
4	**FD-534**	**FD-544**	**FD-554**	**FD-564**	
Ten	**£5·00**	**5·30**	**5·90**	**7·60**	*ax*
Each	**£0·55**	**0·59**	**0·66**	**0·84**	



FD-573 to FD-584

FILTER FUNNELS, *SintaGlass,* with sintered plate. FD-582 can be used as a mercury filter for passing mercury through under its own weight.

Capacity, approx.	30	120 ml	*ax*
Plate diameter	20	30 mm	
Height above plate	100	200 mm	
Porosity	List Numbers		
1	—	**FD-581**	
2	—	**FD-582**	
3	**FD-573**	**FD-583**	
4	**FD-574**	**FD-584**	
Ten	**£8·60**	**11·20**	*ax*
Each	**£0·96**	**1·25**	

FILTERS, immersion, thimble form, see gas distribution tubes GD-841 to GD-853 in List No. sequence.

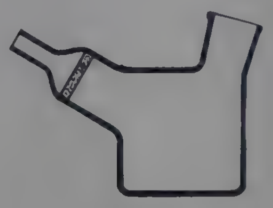
SINTAGLASS FILTERS

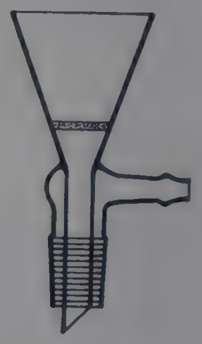
Porosity	Code colour	BS 1752 specified range of maximum pore dia.	Sintaglass, range of maximum pore dia.
		µm	µm
0	White	150 – 250	**200 – 250**
1	Yellow	90 – 150	**100 – 120**
2	Green	40 – 90	**40 – 50**
3	Black	15 – 40	**20 – 30**
4	Orange	5 – 15	**5 – 10**

For other useful information see data on pages headed Sintered Glassware.

FD-594

FILTER BEAKER, *Sintaglass,* 10 mm dia. porosity 4 sintered plate sealed into side spout. Capacity approx. 6 ml ... ... Ten **£16·00** Each **£1·80** *ax*


FD-594


FD-603

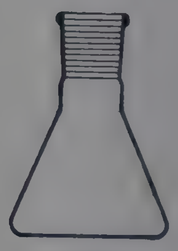
FD-603

FILTER FUNNEL, *Sintaglass,* **micro-Hirsch,** with 10 mm dia. porosity 3 sintered plate, 35 mm dia. funnel top, 14/15 cone and vacuum connection. For use with flask FD-606 ... ... Ten **£15·00** Each **£1·70** *ax*

ACCESSORY

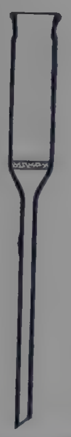
FD-606 **Flasks** conical, with 14/15 socket.

Capacity	10	25 ml	
Ten	**£4·80**	**5·00**	*ax*
Each	**£0·53**	**0·55**	


FD-606

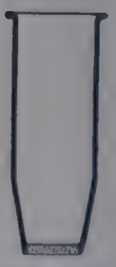
FILTER FUNNELS, *Sintaglass,* plate diameter 10 mm. FD-613 to FD-624 are to BS 1428 Part F1.

Capacity	1	3	6 ml	
Height above plate	15	40	100 mm	
Porosity		List Numbers		
1	—	**FD-621**	—	
3	**FD-613**	**FD-623**	**FD-633**	
4	**FD-614**	**FD-624**	**FD-634**	
Ten	**£6·30**	**6·30**	**6·10**	*ax*
Each	**£0·72**	**0·72**	**0·70**	


FD-613 to FD-634

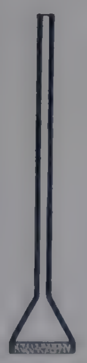
FD-643

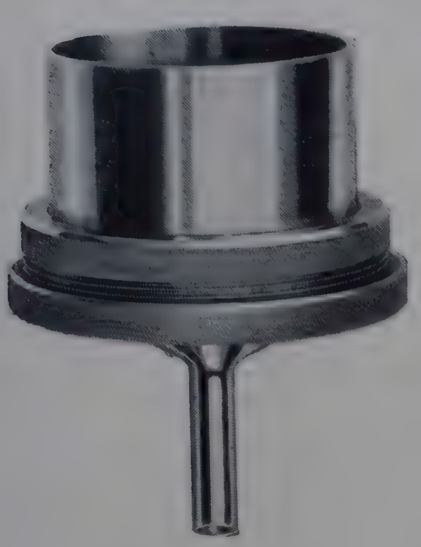
FILTER TUBE, *Sintaglass,* for use inside a 15 ml centrifuge tube. With 10 mm dia. porosity 3 sintered plate. Height 45 mm, capacity approx. 3 ml.
Ten **£12·20** Each **£1·35** *ax*


FD-643

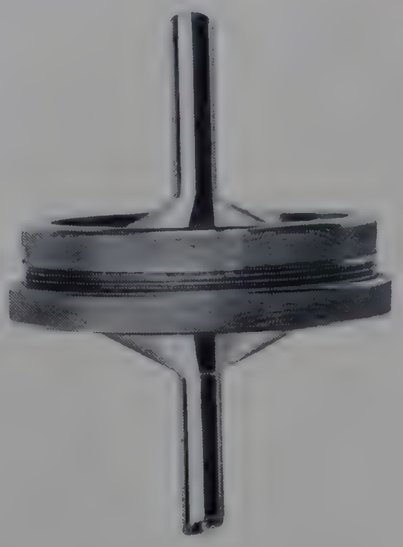
FD-654

IMMERSION FILTER, (Filter Stick) *Sintaglass,* Pregl pattern to BS 1428 Part F1. With 10 mm dia. porosity 4 sintered plate. Overall length 60 mm.
Ten **£8·80** Each **£0·98** *ax*

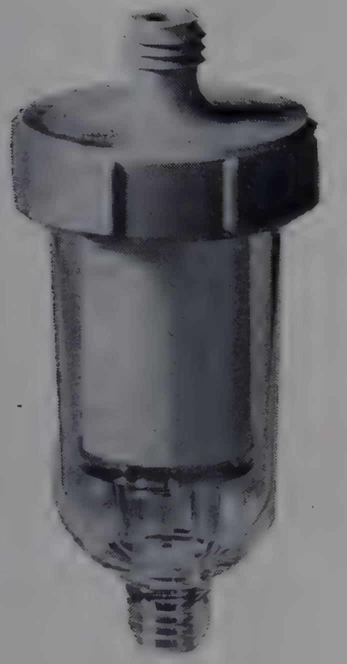

FD-654



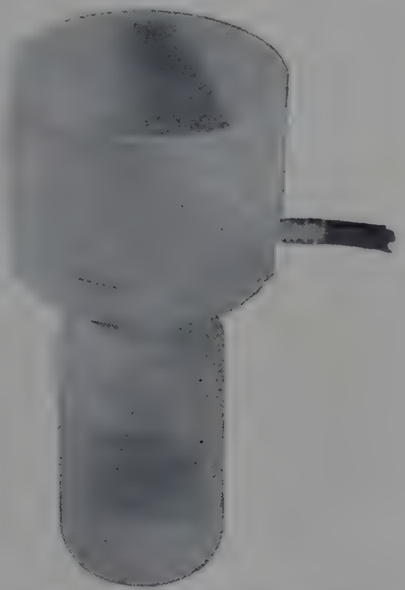
FD-704
FD-706



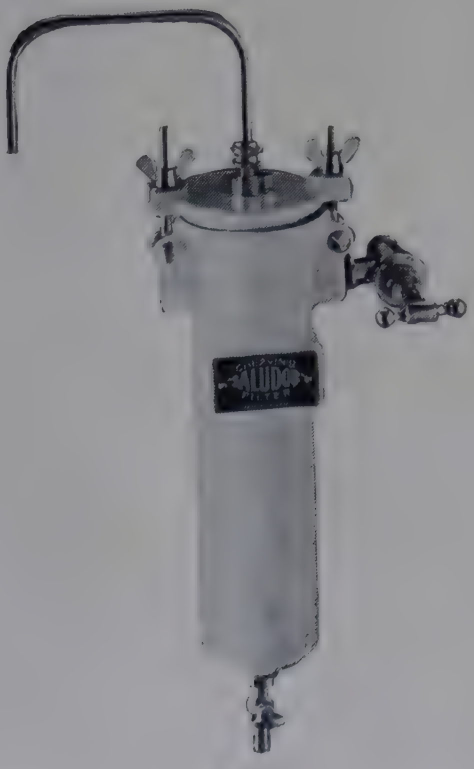
FD-708
FD-710



FD-780



FD-835 with receiver



FD-860

STAINLESS STEEL FILTERS

Buchner and in-line filters with stainless steel bodies, 3 mm thick porous stainless steel disks and silicone rubber washers. The two halves of the bodies are held together by screwed clamping rings.

Disk specification

Porosity	1	2	3	4
Average pore size, µm	70	46	28	6·5

All filters are supplied with disk porosity No. I unless otherwise stated on order.

FD-704
FILTER FUNNEL, Buchner, as specification, with 6·5 cm dia. disk ... ... Each **£11·40** *mx*

FD-706
FILTER FUNNEL, Buchner, as FD-704, but with 10·3 cm dia. disk ... ... Each **£20·85** *mx*

FD-708
FILTER, PIPELINE, as specification, with 6·5 cm dia. disk and 9·5 mm inlet and outlet tubes. Each **£11·60** *mx*

FD-710
FILTER, PIPELINE, as FD-708, but with 10·3 cm dia. disk and 9·5 mm inlet and outlet tubes. Each **£20·55** *mx*

REPLACEMENT PARTS

For filters 6·5 cm dia.

FD-719	**Screwed rings**	Pair	**£3·90** *mx*
FD-722	**Funnel**	Each	**£2·90** *mx*
FD-723	**Buchner top**	Each	**£2·70** *mx*
FD-725	**Filter disk.** State porosity 1, 2, 3 or 4 when ordering.	Each	**£1·20** *mx*
FD-726	**Washer silicone rubber**	Each	**£0·70** *mx*

For filters 10·3 cm dia.

FD-729	**Screwed rings**	Pair	**£7·75** *mx*
FD-732	**Funnel**	Each	**£5·00** *mx*
FD-733	**Buchner top**	Each	**£5·30** *mx*
FD-735	**Filter disk.** State porosity 1, 2, 3 or 4 when ordering.	Each	**£2·00** *mx*
FD-736	**Washer silicone rubber**	Each	**£0·80** *mx*

MISCELLANEOUS FILTERS

FD-780
FILTER UNIT, in-line, *Whatman* **Gamma 12,** for use with gases or liquids. Comprises polycarbonate body, glass fibre filter tube and fluoroelastomer body seal. Can be autoclaved at 135°C and used up to 110°C with compatible fluids.

Tube grade	80	20	10	03
*Liquid filtration, particle size	8	2	1	0·3 microns
†Air filtration, penetration	9	0·05	0·0001	0·0001%

*98% removed from water at 20°C. †Sodium flame test.

Flow rates up to 800 l/hr for water and 600 l/min air depending on tube grade. End nozzles accept 12·5 mm bore flexible tubing. Overall dimensions 60 mm dia. × 125 mm high. **With one each filter tubes grades 80, 20, 10 and 03** ... ... Each **£3·34** *mx*

REPLACEMENT PARTS

FD-784 **Filter tubes.** In boxes of 2.

Grade	80	20	10	03
Box	**£0·41**	**0·48**	**0·53**	**0·67** *mx*

***FD-835**
FILTER, Buchner type, polythene, for vacuum filtration using 11 cm dia. filter paper. In two pieces for ease of cleaning. With nozzle for 6·5 mm bore vacuum tubing and gasket to seal the filter on receivers with necks from 26 to 65 mm i.d. The top has a capacity of approximately 750 ml ... ... Each **£3·75** *mx*

FD-860
FILTER, for permanent installation on water supply. Output approx. 100 l/hr with inlet water supply pressure of 2·8 kgf/cm². Supplied with wall bracket and instructions ... ... Each **£12·60** *mx*

FD-862 **Spare cylinder,** 25 × 5 cm ... ... Each **£2·55** *mx*

FIRE EXTINGUISHERS

FF-300
EXTINGUISHER, bromochlorodifluoromethane (BCF). Effective for small oil, solvent and electrical fires. Must be used with caution in confined spaces. In handy aerosol container with mounting bracket.
12 **£19·80** Each **£1·85** *mx*

FF-310
EXTINGUISHER, bromochlorodifluoromethane (BCF), capacity approx. 1·3 kg. Effective for oil, solvent and electrical fires. Must be used with caution in confined spaces. In pressurised container with squeeze grip control which enables short burst of BCF to be aimed as necessary. Supplied with wall bracket. Each **£12·25***mxN*

FF-300

FF-310

FF-400
EXTINGUISHER, carbon dioxide, capacity approx. 1 kg, with squeeze grip control valve, for all types of small fires. With initial charge ... ... Each **£20·50***mxN*

FF-460
FIRE BUCKET, rigid polythene, D shape, coloured red with 'FIRE' blocked in black. Dimensions approx. 28 × 28 × 25 cm, capacity 9 litres ... Each **£1·60** *mx*

FF-400

FF-460

PROTECTIVE CLOTHING

CP-705 to CP-720 Aprons
CP-835 to CP-890 Goggles and Face Shields
CP-770 to CP-820 Gloves
CP-898 to CP-920 Respirators

For full details and prices see entries in List No. sequence.

FIRST AID

FF-820
FIRST AID CABINET, suitable for up to 50 people, 33 cm wide × 10 cm high × 22 cm deep. Grey mottled enamelled case with lugs for wall fixing. Contains dressings and sundries to comply with Home Office Factory Regulations with extras: bottle TCP; tube Acriflavine cream; scissors; tweezers; eye bath; 6·3 × 90 cm dressing strip and 15 cm kidney tray ... Each **£7·26** *fx*

FF-840
FIRST AID CABINET, suitable for 50 to 150 people, 39 cm wide × 13 cm high × 29 cm deep. Grey mottled enamelled case with lugs for wall fixing. Contains dressings and sundries to comply with Home Office Factory Regulations with extras: bottle TCP; tube Acriflavine cream; scissors; tweezers; eye bath; 6·3 × 90 cm dressing strip and 15 cm kidney tray ... ... Each **£13·44** *fx*

FF-840

Gallenkamp FLAME ANALYSER

FOR FLAME PHOTOMETRIC DETERMINATIONS OF SODIUM, POTASSIUM AND CALCIUM

Applications include:

- **Biochemical and clinical samples**
- **Pharmaceuticals and cosmetics**
- **Plant and animal tissues**
- **Fertilisers and foods**
- **Water and oils**
- **Cement, glass and ceramics**

Gallenkamp

FH-500

- **High sensitivity—5 ppm K and 2 ppm Na full scale**
- **Good linearity characteristics**
- **Insignificant cross interference**
- **Negligible drift**
- **Accurate readings from 0·5 ml sample**

Technical Data:

Sodium 2 ppm (0·085 mE/l) f.s.d. at maximum sensitivity.

Potassium 5 ppm (0·125 mE/l) f.s.d. at maximum sensitivity.

Calcium see notes under FH-545.

Sample uptake rate: 4 ml/min.

Volume per reading: 0·5 ml.
(For highest accuracy the average of several readings should be taken).

Repeatability: 1%.

Cross interference: normally <5% for 100-fold excess of cation.

Accuracy of analysis

Quantitative analysis is only as good as the **specificity** of the method. In flame photometry it is essential that the instrument isolates the element to be determined and that other similar elements should not affect the readings.

In the *Gallenkamp* Flame Analyser the cross interference from a 100-fold excess of interfering cation is normally less than 5% for sodium and potassium. This means that, in the great majority of cases, interference is completely negligible.

The Flame Analyser has excellent linearity characteristics and, for many purposes, it can be assumed that the galvanometer reading is proportional to the concentration of the solution. For the highest accuracy work, however, a calibration curve should be prepared.

Also, when accuracy is vital, the average of several readings should be taken but, since **the Flame Analyser requires only 0·5 ml sample per reading,** this does not involve large quantities of sample.

For calcium determinations see FH-545.

Gallenkamp FLAME ANALYSER

DESIGN FEATURES

- **Suitable for town (coal) gas, natural (methane) gas, bottled gas and petrol-air gas**
- **Controls recessed to prevent inadvertent alteration**
- **All components easily and completely accessible**
- **Robust galvanometer simply adjusted**
- **Convenient flick-over filter turret**
- **All parts corrosion resistant—camera black interior**

A non-conducting collar in the burner head ensures that the temperature, and hence the geometry, of the mixing chamber rapidly stabilises. For this reason the warming up period is virtually negligible.

Surplus liquid from the atomiser chamber is drawn off by a siphon drain which may be fed out to a sink at any distance away. The siphon prevents gas being drawn down the outlet and any consequent dip in reading when sufficient drain-off has collected in the tube to overcome surface tension and run off to the sink.

All working parts except the galvanometer scale are mounted on a rigid base over which is fitted a fibreglass cover. This construction simplifies cleaning and servicing since all components are accessible when the cover is removed without the need to detach controls or service connections. The atomiser burner tube assembly, placed behind a removable side cover, is detached for cleaning by loosening a single milled nut.

The lay-out is designed to leave only the galvanometer scale facing the operator and so to avoid distraction. All controls are conveniently situated and easy to adjust.

Services required

Compressed air (clean, oil free): 1·0 kgf/cm² (15 lbf/in²) max.

Gas supply: coal gas (4 to 6 in w.g.), natural (methane) gas (6 to 8 in w.g.), or butane, propane, petrol-air gas (4 to 10 in w.g.).

Electricity: 100/120 and 200/250V a.c.

Dimensions and weight

Overall 380 × 200 × 400 mm high
Weight 8 kg

FH-500

FLAME ANALYSER, *Gallenkamp*, as specification, with sodium and potassium filters, plastics dust cover, and twelve polystyrene beakers. For 100/120 and 200/250V a.c. single phase supplies ... Each **£221·00** *gx*

Instruments can be supplied for battery operation. Prices on application.

REPLACEMENT PARTS

FH-510	**Atomiser**	Each	**£7·00**	*gx*
FH-516	**Filter,** sodium	Each	**£5·40**	*gx*
FH-518	**Filter,** potassium	Each	**£5·40**	*gx*
FH-525	**Photocell**	Each	**£6·00**	*gx*
FH-540	**Dust cover,** plastics	Each	**£1·30**	*gx*

ACCESSORIES

FH-545	**Filter,** calcium. Recommended only where the calcium is isolated from interfering cations, or where compensation for interference may be effected either by arithmetic correction or by doping the standard solution.	Each	**£16·70**	*mx*

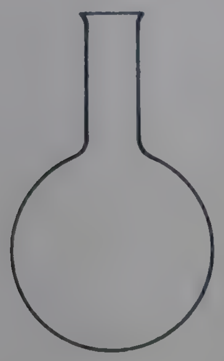
AF-512	**Air compressor**	For details and prices see entries in List No. sequence.
BJ-840	**Beakers,** polystyrene	
BT-205	**Bottles,** polythene	
LV-050	**Gas lighter**	
TX-772	**Tubing,** PVC, N6·5	
WB-100	**Washbottle,** polythene, 250 ml ...	

OUTFIT

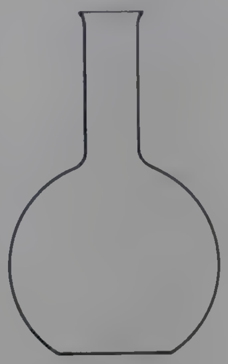
The following list is a guide to the items required for an initial outfit for the determination of sodium and potassium.

1 Flame Analyser	FH-500
1 Air Compressor	AF-512
10 Bottles, polythene for storage of chemicals (glass bottles must not be used)	BT-205
10 metres Tubing, PVC, for drain and air and gas	TX-772 N6·5
1 Gas Lighter	LV-050
3 Washbottles, polythene	WB-100 250 ml

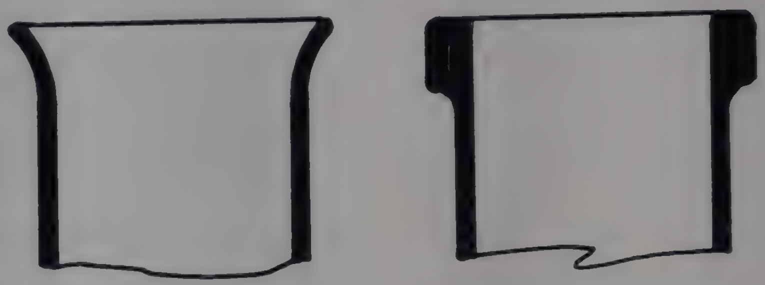
In addition an analytical balance and volumetric glassware for the preparation of standard solutions are required.



FJ-010



FJ-030



up to 55 mm dia.
vial neck **V**

over 55 mm dia.
tooled ring **TR**

Neck finishes for *Pyrex* flasks

ROUND BOTTOM FLASKS

FJ-010

FLASKS, round bottom, *Pyrex* glass.

Capacity	25	50	100	250 ml	
Neck finish	V	V	V	V	
Std. pack qty.	12	96	72	72	
Std. pack	£2·40	17·15	15·57	17·60	*jx*
Dozen	£ —	2·35	2·90	3·20	
Each	£0·26	0·26	0·30	0·33	

Capacity	500	1000	2000 ml	
Neck finish	V	V	V	
Std. pack qty.	48	36	18	
Std. pack	£16·55	17·80	15·35	*jx*
Six	£ 2·30	3·20	—	
Each	£ 0·42	0·58	0·98	

Capacity	5	10	20 litres	
Neck finish	TR	TR	TR	
Std. pack qty.	6	4	1	
Std. pack	£12·10	16·55	—	*jx*
Each	£ 2·20	4·40	6·10	

FLAT BOTTOM FLASKS

FJ-030

FLASKS, flat bottom, *Pyrex* glass.

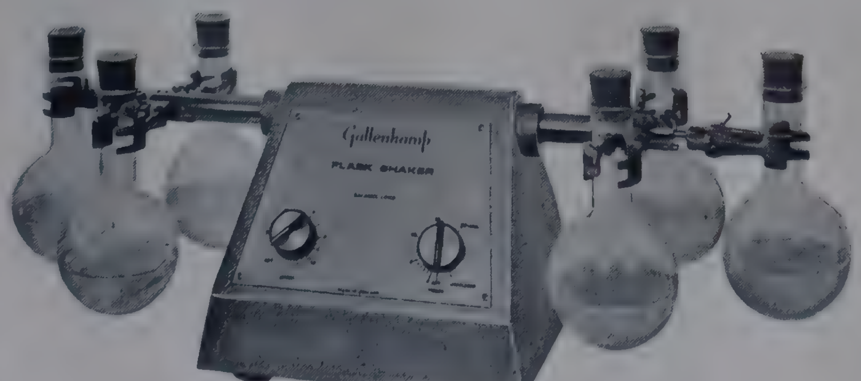
Capacity	50	100	250 ml	
Neck finish	V	V	V	
Std. pack qty.	120	144	72	
Std. pack	£24·30	38·63	18·45	*jx*
Dozen	£ 2·70	3·60	3·30	
Each	£ 0·29	0·35	0·34	

Capacity	500	1000	2000 ml	
Neck finish	V	V	V	
Std. pack qty.	60	36	18	
Std. pack	£21·10	18·85	15·95	*jx*
Six	£ 2·35	3·40	—	
Each	£ 0·44	0·62	1·02	

Capacity	3	5	10 litres	
Neck finish	V	TR	TR	
Std. pack qty.	12	6	4	
Std. pack	£15·25	8·90	16·70	*jx*
Each	£ 1·40	1·60	4·20	

Gallenkamp FLASK SHAKER

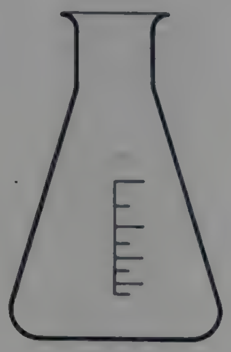
For dissolving, dispensing, extracting and other applications.

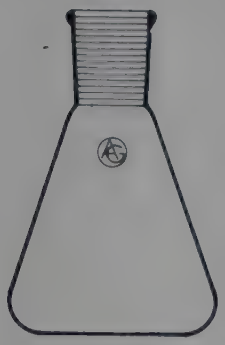


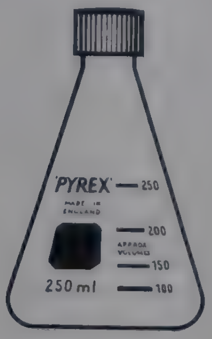
- **Accepts up to six 500 ml flasks**
- **Positive grip clamps**
- **Speeds up to 800 oscillations/min**
- **Integral 0 to 20 minute timer**

Available for 220/240V and 110/120V 50/60 Hz single phase supplies.

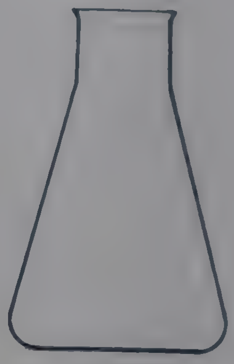
See SD-110 in List No. sequence.


FJ-050


FJ-058



FJ-065


FJ-070

NARROW MOUTH CONICAL FLASKS

(ERLENMEYER FLASKS)

FJ-050

FLASKS, conical, narrow mouth, *Pyrex* glass. With two or more graduations showing approximate capacities. All sizes with vial neck as illustration on opposite page.

Capacity	5	10	25 ml	
Std. pack qty.	60	60	120	
Std. pack	£10·40	10·40	20·70	*jx*
Dozen	£ 2·25	2·25	2·30	
Each	£ 0·25	0·25	0·26	

Capacity	50	100	150 ml	
Std. pack qty.	144	144	72	
Std. pack	£29·56	24·90	12·85	*jx*
Dozen	£ 2·80	2·35	2·35	
Each	£ 0·30	0·26	0·26	

Capacity	250	500	1000 ml	
Std. pack qty.	72	72	36	
Std. pack	£15·40	20·15	19·36	*jx*
Six	£ 1·45	1·90	3·50	
Each	£ 0·29	0·36	0·64	

Capacity	2	3	5 litres	
Std. pack qty.	24	15	6	
Std. pack	£19·85	18·10	10·75	*jx*
Each	£ 0·94	1·35	1·95	

FJ-058

FLASKS, conical, narrow mouth with interchangeable socket, Ⓐ, borosilicate glass. Socket 24/29 without stopper.

Capacity	100	250	500	1000 ml	
Ten	£7·20	7·80	8·40	10·60	*ax*
Each	£0·80	0·86	0·94	1·18	

ACCESSORIES

SU-520	**Stopper,** borosilicate glass, cone 24/20	For prices see entries in List No. sequence.
SU-710 **SU-712**	**Stoppers,** polypropylene, cone 24/29	

FJ-065

FLASKS, conical, *Pyrex* glass, **narrow mouth** with **screw cap.** Can be autoclaved at 121°C. With two or more graduations showing approximate capacity.

Capacity	50	100	250	500	1000 ml	
Std. pack qty.	12	12	12	12	12	
Std. pack	£7·80	7·95	8·00	9·00	13·85	*jx*
Each	£0·72	0·74	0·74	0·84	1·30	

REPLACEMENT PARTS

FJ-067 **Caps,** with liner. In packs of 24.

For flasks	50/100	250/500	1000 ml	
Pack	£1·31	1·73	2·94	*jx*

WIDE MOUTH CONICAL FLASKS

FJ-070

FLASKS, conical, wide mouth, *Pyrex* glass. Illustration of neck finishes see opposite page.

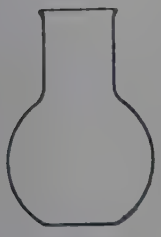
Capacity	50	100	250 ml	
Neck finish	V	V	V	
Std. pack qty.	144	96	72	
Std. pack	£26·62	17·15	16·25	*jx*
Dozen	£ 2·55	2·35	2·95	
Each	£ 0·27	0·26	0·31	

Capacity	500	1000	2000 ml	
Neck finish	V	V	TR	
Std. pack qty.	48	36	24	
Std. pack	£14·30	18·20	21·00	*jx*
Six	£ 1·95	3·30	—	
Each	£ 0·38	0·59	1·00	

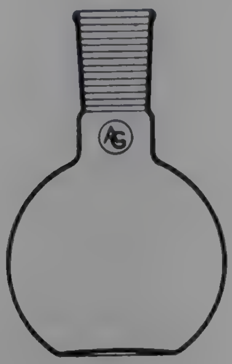
BJ-695 **BEAKERS,** conical form, capacities 125 to 1000 ml.
BJ-725 **BEAKER FLASKS,** capacities 200 to 500 ml.
CX-350 **CULTURE FLASK,** conical, capacity 1000 ml.
CX-380 **CULTURE FLASKS,** fluted, capacities 500 to 2000 ml.

For details see entries in List No. sequence.

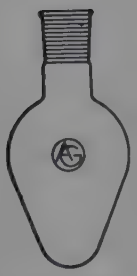
QUANTITY DISCOUNTS for glassware in bulk quantities see 'Conditions of Sale' at front of catalogue.



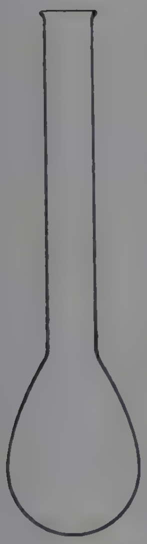
FJ-100



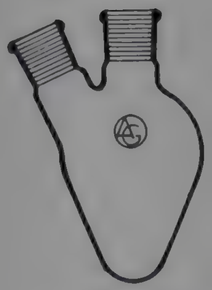
FJ-110



FJ-195



FJ-160
FJ-170



FJ-196

SOXHLET EXTRACTION BATHS
see EV-100 et seq.

KJELDAHL DIGESTION ASSEMBLIES
see NP-900 et seq.

SEMI-MICRO PREPARATIVE KITS
see DT-760 et seq.

For details and prices see entries in List No. sequence.

EXTRACTION FLASKS

FJ-100

FLASKS, extraction, *Pyrex* glass, with flat bottom and wide vial neck.

Capacity	100	250 ml	
Std. pack qty.	96	120	
Std. pack	£ 23·87	35·37	*jx*
Dozen	£ 3·30	4·00	
Each	£ 0·34	0·39	

FJ-110

FLASKS, extraction, flat bottom, (AG), short neck with standard socket, borosilicate glass.

Capacity	150	250	500 ml	
Socket	24/29	24/29	29/32	
Ten	£7·40	7·80	9·60	*ax*
Each	£0·82	0·86	1·06	

KJELDAHL FLASKS

FJ-160

FLASKS, Kjeldahl with long neck, *Pyrex* glass.

Capacity	50	100	300 ml	
Std. pack qty.	144	36	60	
Std. pack	£41·15	10·90	28·60	*jx*
Dozen	£ 3·90	3·80	3·20	
Each	£ 0·38	0·38	0·58	

Capacity	500	800 ml	
Std. pack qty.	36	36	
Std. pack	£19·55	23·60	*jx*
Six	£ 3·60	4·30	
Each	£ 0·64	0·78	

FJ-170

FLASK, Kjeldahl, (AG), micro, borosilicate glass, capacity 30 ml ... ...Ten **£2·70** Each **£0·33** *ax*

SEMI-MICRO FLASKS

FJ-195

FLASKS, semi-micro, (AG), pear shape, short neck with 14/15 socket.

Capacity	10	30 ml	
Ten	£6·30	9·60	*ax*
Each	£0·72	1·06	

FJ-196

FLASK, semi-micro, (AG), pear shape with 2 necks 14/15 sockets, capacity 30 ml, borosilicate glass.
Ten **£13·60** Each **£1·50** *ax*

FD-606

FLASKS, semi-micro, (AG), conical, capacities 10 and 25 ml with 14/15 socket neck. For prices see entry in List No. sequence.

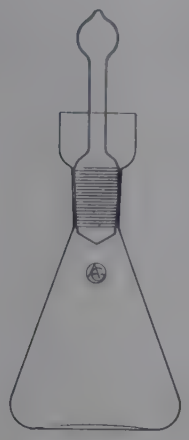
QUANTITY DISCOUNTS for glassware in bulk quantities see 'Conditions of Sale' at front of catalogue.

IODINE FLASK

FJ-260

FLASK, iodine determination, AG, borosilicate glass. Conical with cup shaped neck and long handled stopper, cone and socket 24/29. Capacity 250 ml.

Ten **£19·50** Each **£2·20** *ax*


FJ-260

FILTER FLASKS

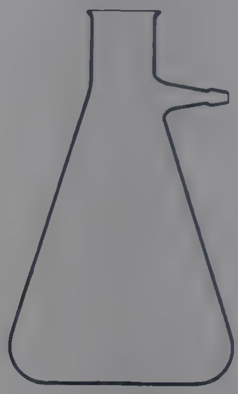
FJ-280

FLASKS, filter, with side arm, heavy wall, *Pyrex* glass. Neck finish as illustrated on page 238.

Capacity	100	250	500	1000 ml	
Neck finish	V	V	V	V	
Std. pack qty.	36	36	24	18	
Std. pack	**£24·37**	**29·56**	**24·00**	**22·70**	*jx*
Each	**£ 0·80**	**0·98**	**1·14**	**1·45**	

Capacity	2	5	10 litres	
Neck finish	V	V	TR	
Std. pack qty.	12	4	4	
Std. pack	**£21·70**	**20·65**	**23·00**	*jx*
Each	**£ 2·05**	**5·50**	**6·20**	

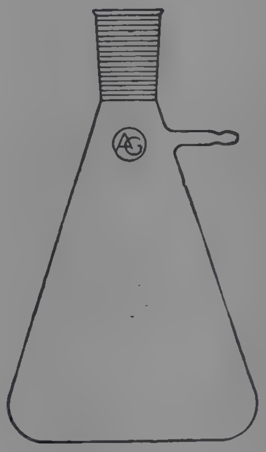
100 ml to 2 litre sizes conform to BS 1739.


FJ-280

FJ-290

FLASKS, filter, AG, conical, heavy wall borosilicate glass with sidearm and 29/32 socket.

Capacity	500	1000 ml	
Ten	**£21·00**	**25·00**	*ax*
Each	**£ 2·35**	**2·80**	


FJ-290

FILTER FUNNELS, for use with above see FM-601 et seq. in List No. sequence.

DISTILLATION FLASKS

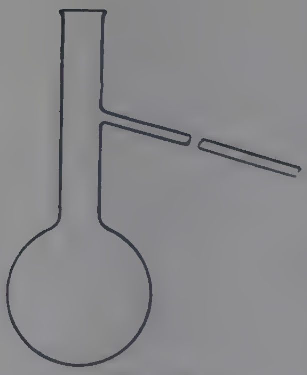
FJ-300

FLASKS, distillation, *Pyrex* glass, to BS 658.

Capacity	100	150	250 ml	
Std. pack qty.	36	36	24	
Std. pack	**£21·50**	**23·00**	**16·50**	*jx*
Dozen	**£ 7·60**	**8·20**	—	
Each	**£ 0·70**	**0·74**	**0·80**	

Capacity	500	†1000 ml	
Std. pack qty.	18	12	
Std. pack	**£14·65**	**10·85**	*jx*
Each	**£ 0·96**	**1·02**	

†This size is not included in BS 658.


FJ-300

PE-797 et seq.

FLASKS, distillation, to IP and ASTM specifications, see entry in List No. sequence.

FLASKS

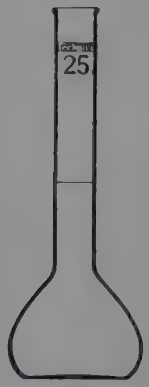
Culture	see	CULTURE
Quickfit	see	QUICKFIT APPARATUS
Standard joint	see	QUICKFIT APPARATUS
Sulphonation	see	PETROLEUM TESTING
Vacuum	see	VACUUM VESSELS

Technico VOLUMETRIC FLASKS

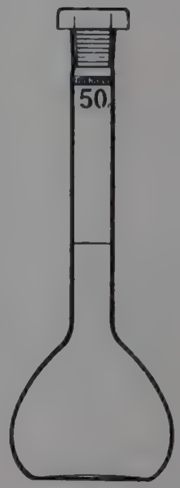
REGD. TRADE MARK

ONE MARK FLASKS TO BS 1792

Technico one mark volumetric flasks are manufactured in our own works in accordance with the requirements of BS 1792 (sizes not included in the BS are on a similar basis). Stoppered flasks have interchangeable neck grinding to BS 572 and sizes 1 to 50 cm³ Class B and 5 to 50 cm³ Class A all have the same 10/13 stopper size for added convenience and interchangeability. The small flasks in Class B have necks which will accept pipettes up to 8·5 mm dia. Stoppered flasks are supplied complete with hexagon head polypropylene stoppers. These stoppers are inert to most reagents, will prevent entrance of dust and give good protection against chipping. If glass stoppers are essential, then stoppers SU-520 can be used.

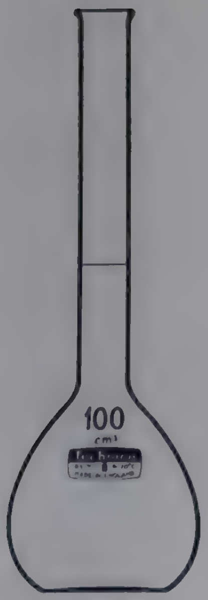


FK-054



FK-074

Small sizes Class B
Wide neck



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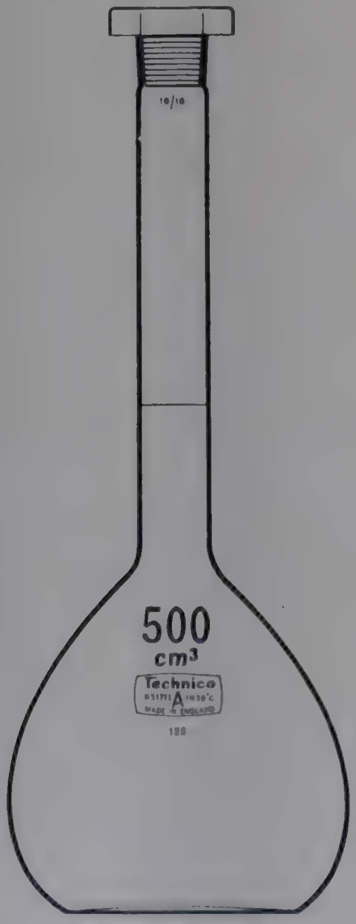


FK-074, FK-076, etc.

Larger sizes classes A and B

Capacity cm³	1 *	2 *	5	10	20 *	25	50
Stopper size	10/13	10/13	10/13	10/13	10/13	10/13	10/13
Tolerance Class B ±cm³ Class A ±cm³	 0·04 —	 0·04 —	 0·04 0·02	 0·04 0·02	 0·06 0·03	 0·06 0·03	 0·1 0·05

Capacity cm³	100	200	250	500	1000	2000
Stopper size	12/14	14/15	14/15	16/16	19/17	24/20
Tolerance Class B ±cm³ Class A ±cm³	 0·15 0·08	 0·3 0·15	 0·3 0·15	 0·5 0·25	 0·8 0·4	 1·2 0·6

* **Sizes not included in BS 1792.**

CLEAR GLASS FLASKS WITHOUT STOPPER

With permanent graduations and inscriptions in amber stain.

FK-054

FLASKS, *Technico,* **Class B,** plain neck, as specification.

Capacity	10	25	50 cm³	
Ten	**£4·00**	**4·40**	**4·60**	ax
Each	**£0·45**	**0·49**	**0·51**	

Capacity	100	250	500 cm³	
Ten	**£4·80**	**5·60**	**6·80**	ax
Each	**£0·53**	**0·62**	**0·76**	

CLEAR GLASS FLASKS WITH STOPPERS

With permanent graduations and inscriptions in amber stain.

FK-074

FLASKS, *Technico,* **Class B,** as specification, with interchangeable polypropylene stopper.

Capacity	1 *	2 *	5	10	20 * cm³	
Ten	**£3·40**	**3·70**	**3·70**	**3·80**	**4·10**	ax
Each	**£0·40**	**0·43**	**0·43**	**0·44**	**0·46**	

Capacity	25	50	100	200 cm³	
Ten	**£4·10**	**4·40**	**5·40**	**6·60**	ax
Each	**£0·46**	**0·49**	**0·60**	**0·74**	

Capacity	250	500	1000	2000 cm³	
Ten	**£7·00**	**8·80**	**11·80**	**19·50**	ax
Each	**£0·78**	**0·98**	**1·30**	**2·20**	

* **Sizes not included in BS 1792.**

When ordering specify *Technico* volumetric glassware.

Technico VOLUMETRIC FLASKS

REGD. TRADE MARK

ONE MARK FLASKS TO BS 1792

CLEAR GLASS FLASKS WITH STOPPERS
(continued)

With permanent graduations and inscriptions in amber stain.

FK-076

FLASKS, *Technico,* **Class A,** as specification, with interchangeable polypropylene stopper.

Capacity	5	10	20 *	25	50	100 cm³	
Ten	**£6·80**	**7·00**	**7·60**	**7·60**	**8·20**	**8·60**	*ax*
Each	**£0·76**	**0·78**	**0·84**	**0·84**	**0·92**	**0·96**	

Capacity	200	250	500	1000	2000 cm³	
Ten	**£9·60**	**9·60**	**13·00**	**16·00**	**25·50**	*ax*
Each	**£1·06**	**1·06**	**1·45**	**1·80**	**2·80**	

FK-077

FLASKS, *Technico,* **Class A with works certificate of examination** stating volume of the flask at 20°C. With interchangeable polypropylene stopper.

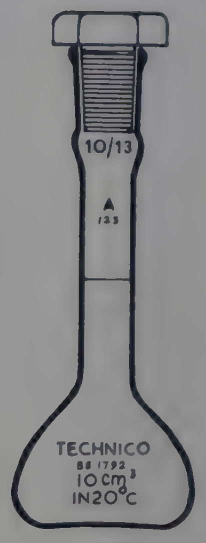
Capacity	5	10	20 *	25	50	100 cm³	
Ten	**£9·20**	**9·40**	**10·00**	**10·00**	**10·60**	**11·00**	*ax*
Each	**£1·02**	**1·04**	**1·12**	**1·12**	**1·18**	**1·25**	

Capacity	200	250	500	1000	2000 cm³	
Ten	**£12·00**	**12·00**	**15·40**	**18·40**	**27·90**	*ax*
Each	**£ 1·35**	**1·35**	**1·75**	**2·05**	**3·10**	

*** Sizes not included in BS 1792.**

NOTE: FLASKS, *Technico,* **Class A** with British Standard Test (BST) certificate. Available to special order.

When ordering specify *Technico* volumetric glassware.



FK-076
Small sizes Class A
Narrow neck

AMBER GLASS FLASKS WITH STOPPERS

FK-084

FLASKS, *Technico,* **Class B** low-actinic **amber stained glass** with interchangeable polypropylene stopper. Shape as FK-074.

Capacity	25	50	100	250	500	1000 cm³	
Ten	**£8·00**	**8·40**	**9·20**	**11·00**	**13·20**	**19·50**	*ax*
Each	**£0·90**	**0·94**	**1·02**	**1·25**	**1·50**	**2·20**	

SU-520

STOPPERS, Ⓐ, **borosilicate glass,** to BS 572, suitable for use with *Technico* volumetric flasks. For details and prices see entry in List No. sequence.

PYREX FLASKS WITH STOPPERS

FK-094

FLASKS, to BS 1792, *Pyrex* glass, **Class B,** with interchangeable solid glass stopper.

Capacity	25	50	100	250 cm³	
Std. pack qty.	12	12	12	12	
Std. pack	**£16·20**	**16·35**	**17·55**	**18·00**	*jx*
Each	**£ 1·50**	**1·50**	**1·65**	**1·70**	

Capacity	500	1000	2000 cm³	
Std. pack qty.	6	6	1	
Std. pack	**£10·25**	**11·75**	—	*jx*
Each	**£ 1·85**	**2·10**	**3·00**	

FK-096

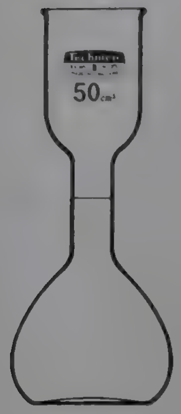
FLASKS, to BS 1792, *Pyrex* glass, **Class A**, with interchangeable solid glass stopper.

Capacity	25	50	100	250 cm³	
Std. pack qty.	12	12	12	12	
Std. pack	**£19·70**	**21·40**	**25·15**	**24·10**	*jx*
Each	**£ 1·85**	**2·00**	**2·35**	**2·25**	

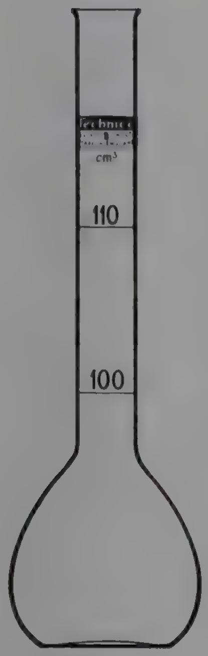
Capacity	500	1000	2000 cm³	
Std. pack qty.	6	6	1	
Std. pack	**£12·85**	**14·75**	—	*jx*
Each	**£ 2·30**	**2·65**	**603·**	

Technico VOLUMETRIC FLASKS

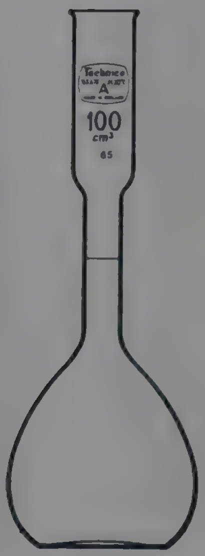
REGD. TRADE MARK



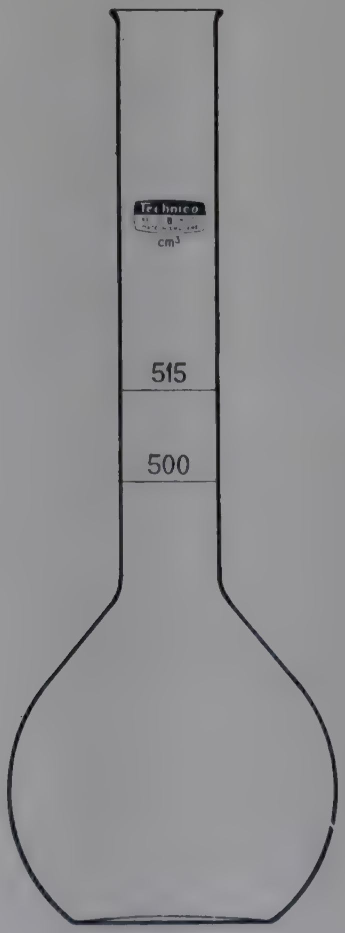
FK-134



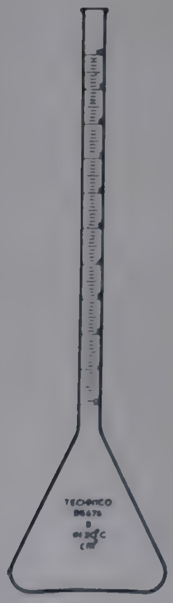
FK-164



FK-176



FK-204



FK-244

KOHLRAUSCH FLASKS

With permanent graduations and inscriptions in amber stain.

FK-134

FLASKS, Kohlrausch, *Technico,* to BS 615, **Class B.**

Capacity	50	100	200 cm³	
Ten	**£7·80**	**8·80**	**9·80**	*ax*
Each	**£0·86**	**0·98**	**1·10**	

FK-136

FLASKS, Kohlrausch, *Technico,* to BS 615, **Class A.**

Capacity	50	100	200 cm³	
Ten	**£13·00**	**14·60**	**16·00**	*ax*
Each	**£ 1·45**	**1·65**	**1·80**	

SUGAR FLASKS

With permanent graduations and inscriptions in amber stain.

FK-164

FLASK, sugar, *Technico,* to BS 675 type 1, **Class B.**
Capacity 100/110 cm³ ... Ten **£7·00** Each **£0·78** *ax*

FK-176

FLASK, sugar, *Technico,* to BS 675 type 2, **Class A.**
Capacity 100 cm³ with narrow neck.
Ten **£16·50** Each **£1·85** *ax*

BREWERS' MASH FLASK

FK-204

FLASK, brewers, mash, *Technico,* to BS 701, **Class B,** with two marks at 500 and 515 cm³.
Ten **£10·60** Each **£1·18** *ax*

HIRSCHSOHN FLASKS

FK-244

FLASKS, Hirschsohn, *Technico,* to BS 676, **Class B.**

Capacity of bulb	150	200 cm³	
Capacity of neck	10	25 cm³	
Neck subdivision	0·1	0·2 cm³	
Ten	**£21·00**	**23·00**	*ax*
Each	**£ 2·35**	**2·55**	

When ordering specify *Technico* volumetric glassware.

DB-800

FLASK, for methylene blue reduction test, capacity 800 cm³. For details and price see entry in List No. sequence.

PE-120

SULPHONATION FLASK, to ASTM D1019-IP 145. For details and price see entry in List No. sequence.

Gallenkamp GAS FLOWMETERS

ORIFICE FLOWMETER

This gas flowmeter is a compact and robust instrument of the orifice type which measures the pressure drop across a jet. The jet is fitted into the main body which is bored out to form one limb of a manometer. The other limb is a glass tube fitted with an 8 cm adjustable scale, providing easy zero adjustment and clear reading. A fine adjustment needle valve is fitted as an integral part of the main body. The whole instrument can be dismantled easily for cleaning, topping-up or for jet changing. It is not suitable for corrosive gases.

INTERCHANGEABLE JETS

The flowmeters are available with any one of five interchangeable jets which cover an air-flow range from 0·07 to 5 litres per minute.

CALIBRATION

Flowmeters are available fitted with a selected jet and calibrated, but for air only. The certificates of calibration which are supplied with such flowmeters show measured values at five points on the scale from which a calibration curve may be constructed.

FL-420

FLOWMETER, ORIFICE, *Gallenkamp*, as specification, with nozzles for rubber tubing connections.
With one uncalibrated jet FL-430 ... Each **£17·50** *bx*

FL-422

FLOWMETER, ORIFICE, *Gallenkamp*, as FL-420 but with **calibrated** jet as selected. Complete with jet and certificate of calibration ... ... Each **£19·10** *bx*

When ordering please state jet size No. required.

FL-430

JETS, interchangeable, uncalibrated, for flowmeters FL-420 and FL-422, with washer.

No.	1	2	3
Range	0·07–0·25	0·15–0·5	0·4–1·25 litres/min

No.	4	5
Range	0·8–2·5	1·5–5·0 litres/min

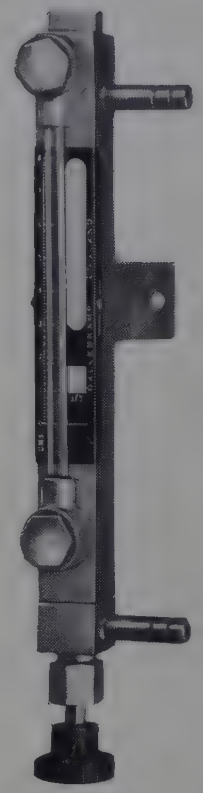
Each **£0·60** *bx*

FL-432

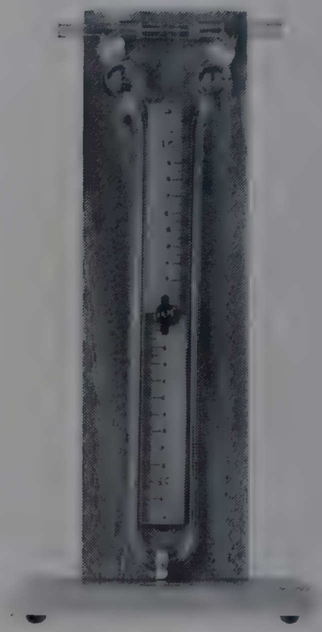
JETS, as FL-430 but **calibrated. With certificate of calibration for air** ... ... Each **£2·20** *bx*

REPLACEMENT PARTS

FL-434	**Gauge glass.** In pack of 5.	10 packs	**£2·40**	Pack	**£0·30** *bx*
FL-435	**Spare washers for jets.** In pack of 10.	10 packs	**£0·75**	Pack	**£0·15** *bx*



FL-420



FL-550

CAPILLARY FLOWMETER

This flowmeter comprises a glass U-tube manometer across the top of which is connected a short length of precision bore capillary. Various ranges are obtained by inserting capillaries of different bores. The readings are taken on a 25 cm boxwood scale divided in mm with centre zero. The meter is mounted on a polished hardwood stand, to which the glass U-tube is attached by spring clips so that it may easily be removed for cleaning.

CALIBRATION

Flowmeters are available fitted with selected capillary tubes and calibrated, but for air only. The certificates of calibration which are supplied with such flowmeters show measured values at five points on the scale from which a calibration curve may be constructed.

FL-550

FLOWMETER, CAPILLARY, (AG), as specification, with one **uncalibrated** capillary as selected.
Each **£8·40** *bx*

When ordering please state required capillary Size No. as shown under List No. FL-554.

FL-552

FLOWMETER, CAPILLARY, (AG), as FL-550 but with **calibrated** capillary as selected. **With certificate of calibration for air** ... ... Each **£10·30** *bx*

FL-554

CAPILLARY TUBES, uncalibrated, covering the following air flow ranges.

Size No.	1	2	3	4	5	6
Range 0 to	10	25	50	100	250	500 ml/min

Size No.	7	8	9	10
Range 0 to	1	2·5	5	10 litres/min

Each **£0·20** *ax*

FL-556

CAPILLARY TUBES as FL-554 but **calibrated. With certificate of calibration for air** ... Each **£2·10** *ax*

REPLACEMENT PART

FL-558	**U-tube,** borosilicate glass	Each	**£3·10** *ax*

FLOWMETER KIT

For measurement of liquid and gas flow.

FL-600

- **Flow ranges**
  - **25 ml/min to 100 l/min for air**
  - **7·5 ml/min to 5 l/min for water**
- **Floats and metering tubes readily changed**
- **Continuous direct reading of flow rate**

Comprises a series of precision bore borosilicate glass metering tubes, anodised aluminium and stainless steel floats, stainless steel end nozzles for 5 mm to 13 mm bore flexible tubing, mounting frame and tripod for vertical mounting.

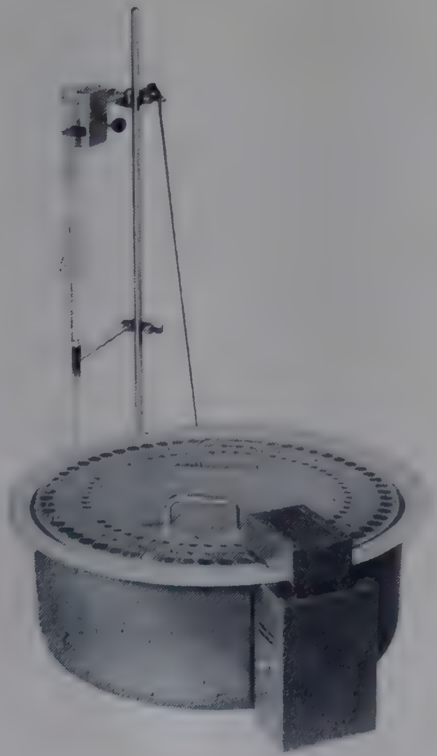
Positive readings are obtained on the 100 mm scale and a clip-on plastics front gives protection to the tube.

Overall height of tubes mounted on tripod 40 cm.

FLOW CUPS	see VISCOMETRY
FOIL, aluminium	see ALUMINIUM
FOIL, platinum	see PLATINUM
FORCEPS, balance weight	see BALANCE ACCESSORIES
FORCEPS, dissecting	see DISSECTING EQUIPMENT
FRACTIONATING COLUMNS	see DISTILLATION and QUICKFIT APPARATUS

FL-600

FLOWMETER LAB-KIT, *Gapmeter*, as specification, comprising five metering tubes, nine floats, three pairs of nozzle connections, mounting frame and tripod. Any of the ten ranges for air and six for water may be assembled. Calibration charts are supplied for the sixteen ranges. Supplied in carrying case... ... ... Each **£38·50** *mx*



Gallenkamp
REGD TRADE MARK

FRACTION COLLECTOR

for volumetric and timed fraction cutting

- **Simple drive mechanism**
- **Very large spillage capacity**
- **Low voltage operation**
- **Free standing collector plate**
- **Capacity 120 tubes**
- **Auto end-of-track arrest**

A **low cost** apparatus especially suitable for schools, technical colleges, universities and general purpose industrial laboratory use.

For full details and prices see CL-270 to CL-292 in List No. sequence.

FREEZE DRYING APPARATUS

Regd.

For drying labile and other biological substances by the sublimation of ice from pre-frozen solutions contained in flasks.

PRINCIPLE

Ice can be removed from evenly distributed films of frozen solution at an average of 40 g/h using a vacuum of about 0·4 torr. The collecting trap should be immersed in a vacuum flask containing liquid air or solid CO_2–ethanol mixture to condense the evaporated moisture. The working capacity of the apparatus is approximately 500 ml.

CONSTRUCTION

The apparatus comprises a head with four sidearms each with a 24/29 socket on which four flasks are fitted. The head which has a 34/35 cone fits into the trap. A vacuum connector arm is situated at the top of the trap and the head is fitted with a vacuum release stopcock.

FM-320

FREEZE DRYING APPARATUS, AG, borosilicate glass, as specification, with head, trap, vacuum adapter, four 250 ml flasks and four pairs of spring connectors, 38 mm long ... ... Each **£13·80** *ax*

REPLACEMENT PARTS

FM-322 **Head,** with 34/35 cone, four sidearms with 24/29 sockets, hooks for spring connectors and a vacuum release stopcock ... ... Each **£5·90** *ax*

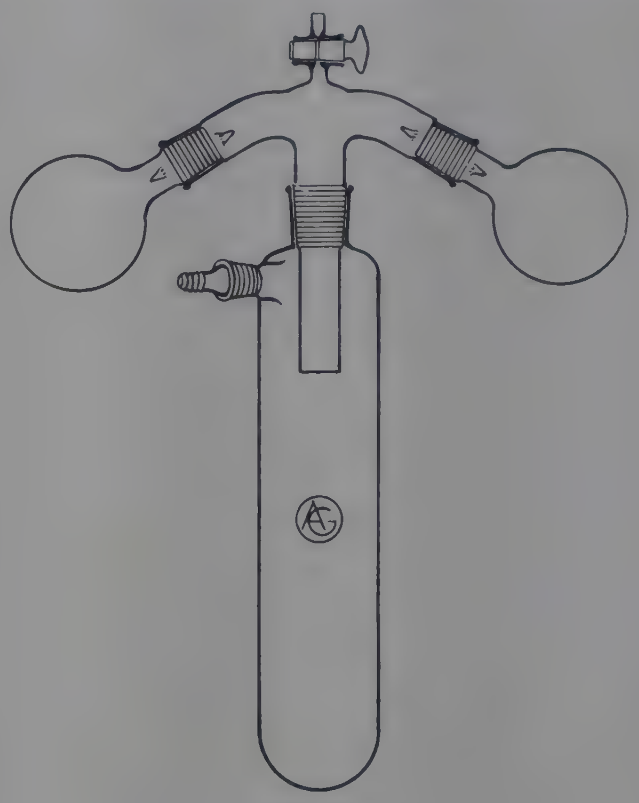
FM-324 **Trap,** with 34/35 socket and sidearm with 19/26 socket. Dia. 65 mm, length to neck 330 mm ... Each **£3·40** *ax*

Q-MF10/2 **Adapter,** with 19/26 cone for vacuum connection. For price see entry in QUICKFIT APPARATUS.

FM-328 **Flasks,** with 24/29 cone and hooks for spring connectors.

Capacity	100	250	500 ml	
Ten	**£7·20**	**8·00**	**9·40**	*ax*
Each	**£0·80**	**0·90**	**1·04**	

JR-140 **Spring connectors,** length 38 mm. For price see entry in List No. sequence.



FM-320

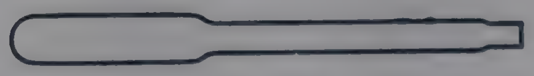
Suitable **vacuum flask** for refrigerant, see **VC-530,** 4500 ml.
Suitable **rotary pump,** single stage, see **VACUUM PUMPS.**

FREEZE DRYING AMPOULES TO BS 795

In clear neutral glass BP quality. The top 11 mm of the open ends are accurately dimensioned (internal neck diameter 5·9–6·1 mm) and glazed.

List No.	BS type	Nominal capacity ml	Nominal length mm	Carton quantity	Carton	
					£	
FM-520	L/05	0·5	100	525	**7·80**	*cx*
FM-522	K/205	2·5	154	368	**20·50**	*cx*
FM-524	K/10	10·0	158	176	**13·20**	*cx*

FM-520



FM-522
FM-524

FREEZING POINT APPARATUS
see MW-020

FREEZING POINT AVIATION FUELS
see PF-360

For details and prices see entries in List No. sequence.

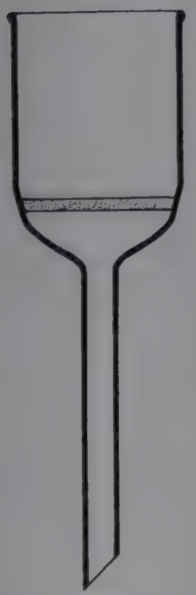
SINTAGLASS FILTER FUNNELS

Manufactured in our own factory under accurately controlled conditions.

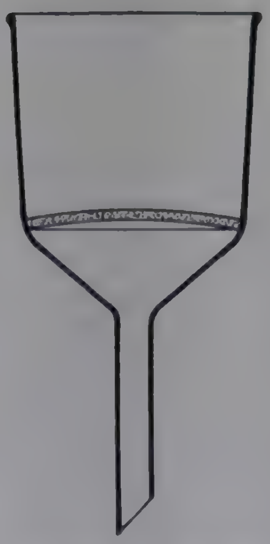
- **Close tolerance porosity ranges**
- **Non-friable sintered plates**
- **Colour coded for porosity**
- **Made from borosilicate glass**

Porosity	Code colour	BS 1752 range of maximum pore dia.	*Sintaglass*, range of maximum pore dia.
		µm	µm
0	White	150 – 250	**200 – 250**
1	Yellow	90 – 150	**100 – 120**
2	Green	40 – 90	**40 – 50**
3	Black	15 – 40	**20 – 30**
4	Orange	5 – 15	**5 – 10**
5	Blue	Not greater than 2	**1 – 1·8**

For additional technical information see data on pages headed Sintered Glassware.



FM-601 to FM-624



FM-640 to FM-654

FUNNELS, *Sintaglass*, **cylindrical**, with sintered glass flat plate.

Capacity approx.	30	60	120 ml	
Plate diameter	30	40	40 mm	
Porosity		List Numbers		
1	**FM-601**	**FM-611**	**FM-621**	
2	**FM-602**	**FM-612**	**FM-622**	
3	**FM-603**	**FM-613**	**FM-623**	
4	**FM-604**	**FM-614**	**FM-624**	
Ten	**£7·80**	**8·60**	**9·20**	ax
Each	**£0·86**	**0·96**	**1·02**	
Porosity				
5	**FM-605**	**FM-615**	—	
Ten	**£16·60**	**18·00**	—	ax
Each	**£ 1·85**	**2·00**	—	

FUNNELS, *Sintaglass*, **Buchner**, with sintered glass plate. Funnels with plate diameter 65 mm have a flat plate. The 90 and 120 mm diameter plates are domed.

Capacity approx.	140	400	700 ml	
Plate diameter	65	90	120 mm	
Porosity		List Numbers		
0	—	**FM-640**	**FM-650**	
1	**FM-631**	**FM-641**	**FM-651**	
2	**FM-632**	**FM-642**	**FM-652**	
3	**FM-633**	**FM-643**	**FM-653**	
4	**FM-634**	**FM-644**	**FM-654**	
Ten	**£16·00**	**21·00**	**31·00**	ax
Each	**£ 1·80**	**2·35**	**3·40**	
Porosity				
5	**FM-635**	—	—	
Ten	**£28·50**	—	—	ax
Each	**£ 3·20**	—	—	

ACCESSORIES

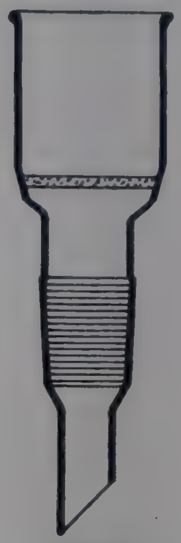
Filter flasks	see	FJ-280
Flask adapter	see	CW-722
Filter pumps	see	FD-210 et seq.

For details and prices see entries in List No. sequence.

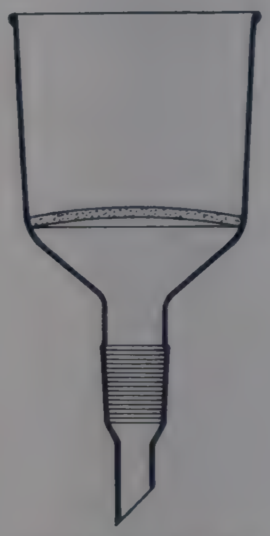
SINTAGLASS FILTER FUNNELS

FUNNELS, *Sintaglass*, cylindrical with sintered glass flat plate and 24/29 cone on stem. Plate diameter 40 mm, capacity approx. 60 ml.

FM-703	Porosity 3	Ten	**£16·00**	Each	**£1·80**	*ax*
FM-704	Porosity 4	Ten	**£16·00**	Each	**£1·80**	*ax*



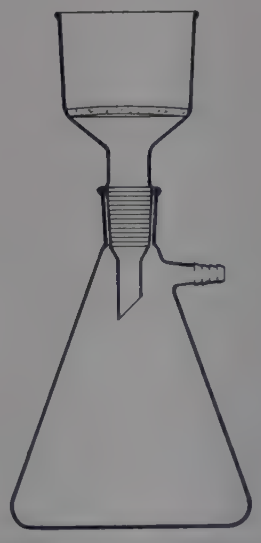
FM-703
FM-704



FM-723 to FM-734
FM-783 to FM-794

FUNNELS, *Sintaglass*, Buchner, with sintered glass plate and 24/29 cone on stem. Funnels with plate diameters 65 mm have a flat plate. The 90 and 120 mm plates are domed.

Capacity approx.	140	400	700 ml	
Plate diameter	65	90	120 mm	
Porosity		List Numbers		
3	**FM-713**	**FM-723**	**FM-733**	
4	**FM-714**	**FM-724**	**FM-734**	
Ten	**£26·00**	**34·00**	**44·00**	*ax*
Each	**£ 2·90**	**3·80**	**5·00**	
Porosity				
5	**FM-715**	—	—	
Ten	**£39·00**	—	—	*ax*
Each	**£ 4·30**	—	—	



FM-723 with Q-FBIL/3

FUNNELS, *Sintaglass*, Buchner, with sintered glass plate and 29/32 cone on stem. Funnels with plate diameters 65 mm have a flat plate. The 90 and 120 mm plates are domed.

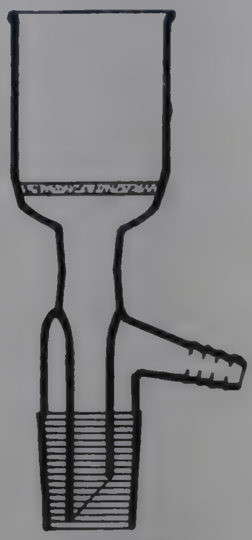
Capacity approx.	140	400	700 ml	
Plate diameter	65	90	120 mm	
Porosity		List Numbers		
3	**FM-773**	**FM-783**	**FM-793**	
4	**FM-774**	**FM-784**	**FM-794**	
Ten	**£26·00**	**34·00**	**44·00**	*ax*
Each	**£ 2·90**	**3·80**	**5·00**	
Porosity				
5	**FM-775**	—	—	
Ten	**£39·00**	—	—	*ax*
Each	**£ 4·30**	—	—	

ACCESSORIES

Filter flasks see Q-FB250/3 and FJ-290
Filter pumps see FD-210 et seq.

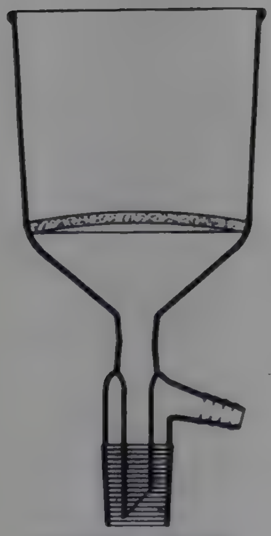
For details and prices see entries in List No. sequence.

SINTAGLASS FILTER FUNNELS


FM-833
FM-834

FUNNELS, *Sintaglass*, **cylindrical,** with sintered glass flat plate, 24/29 cone on stem and side tube for connection to a filter pump. Plate diameter 40 mm, capacity approx. 60 ml.

FM-833	Porosity 3	Ten	**£20·00**	Each	**£2·25**	*ax*
FM-834	Porosity 4	Ten	**£20·00**	Each	**£2·25**	*ax*

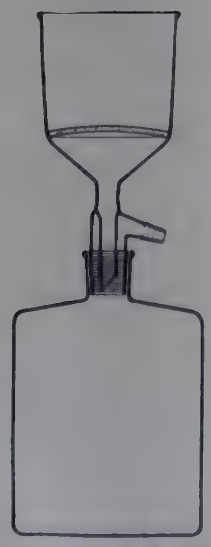

FM-853, FM-854
FM-893, FM-894

FUNNELS, *Sintaglass*, **Buchner,** with sintered glass plate, side tube for connection to a filter pump and 24/29 cone on stem. The 65 mm diameter plate is flat and the 90 mm diameter plate is domed.

Capacity approx.	140	400 ml	
Plate diameter	65	90 mm	
Porosity	List Numbers		
3	**FM-843**	**FM-853**	
4	**FM-844**	**FM-854**	
Ten	**£28·50**	**39·00**	*ax*
Each	**£3·20**	**4·30**	
Porosity			
5	**FM-845**	—	
Ten	**£42·00**	—	*ax*
Each	**£4·70**	—	

FUNNELS, *Sintaglass*, **Buchner,** with sintered glass plate, side tube for connection to a filter pump and 29/32 cone on stem. The 65 mm plate is flat and the 90 mm diameter plate is domed.

Capacity approx.	140	400 ml	
Plate diameter	65	90 mm	
Porosity	List Numbers		
3	**FM-883**	**FM-893**	
4	**FM-884**	**FM-894**	
Ten	**£28·50**	**39·00**	*ax*
Each	**£ 3·20**	**4·30**	
Porosity			
5	**FM-885**	—	
Ten	**£42·00**	—	*ax*
Each	**£ 4·70**	—	


FM-853 with BW-655

RESERVOIR BOTTLES suitable for use with these funnels see BW-655 in List No. sequence.

SINTAGLASS FILTER FUNNELS

FUNNELS, *Sintaglass*, **Hirsch**, with sintered glass flat plate.

Capacity approx.	25	60 ml	
Plate diameter	21	30 mm	
Top diameter	55	80 mm	
Porosity	List Numbers		
3	**FM-923**	**FM-933**	
4	**FM-924**	**FM-934**	
Ten	**£8·00**	**9·60**	*ax*
Each	**£0·90**	**1·06**	

FUNNELS, *Sintaglass*, **Hirsch**, with sintered glass flat plate 21 mm diameter and 19/26 cone on stem. Capacity approx. 21 ml.

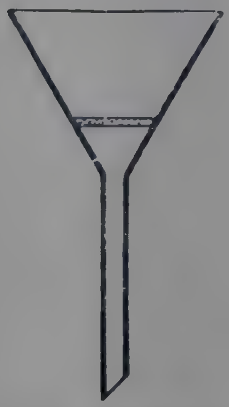
FM-963	Porosity 3	Ten	**£16·00**	Each	**£1·80**	*ax*
FM-964	Porosity 4	Ten	**£16·00**	Each	**£1·80**	*ax*

TF-410

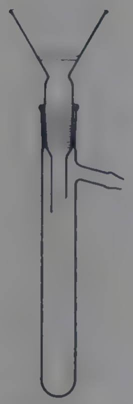
TEST TUBE, with 19/26 socket and side tube, see entry in List No. sequence.

FD-603

FUNNEL, *Sintaglass*, **Hirsch semi-micro**, with 10 mm sintered glass plate, porosity 3, and 14/15 cone on stem. For price see entry in List No. sequence.



FM-923 to FM-934



FM-963 with TF-410

GLASS FUNNELS

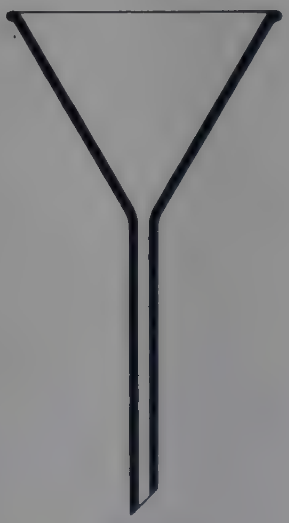
FP-240

FUNNELS, soda-lime glass, plain pattern (see table below).

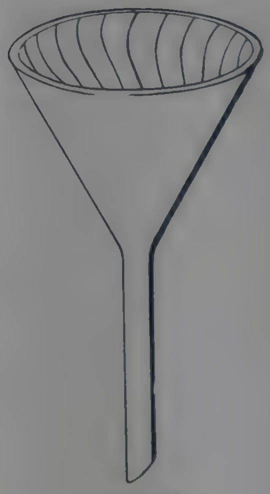
FP-245

FUNNELS, as FP-240 but ribbed (see table below).

List No.	FP-240		FP-245		
Size, cm	25 £	Each £	25 £	Each £	
5	5·20	0·28	5·20	0·28	*cx*
7·5	5·80	0·31	5·80	0·31	*cx*
	Ten £	Each £	Ten £	Each £	
10	2·70	0·33	2·70	0·33	*cx*
15	4·40	0·49	4·40	0·49	*cx*
20	7·80	0·86	7·80	0·86	*cx*
25	15·50	1·75	15·50	1·75	*cx*



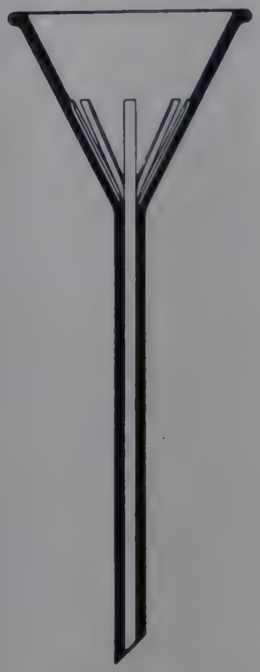
FP-240
FP-270

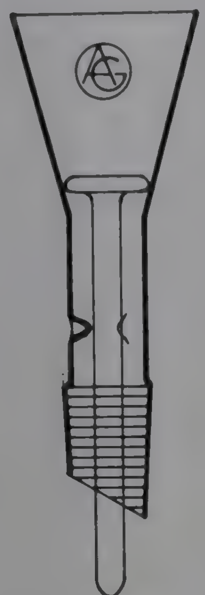


FP-245

FUNNEL STANDS see **SM-210 to SM-244** in List No. sequence.

GLASS FUNNELS (Cont'd)


FP-280


FP-290

FP-270

FUNNELS, *Pyrex* glass, to BS 1923. Length of stem is same as the top diameter of funnel.

Diameter	5	6·2	7·5	8·7 cm	
Std. pack qty.	24	24	24	24	
Std. pack	**£8·35**	**8·70**	**9·75**	**10·35**	*jx*
Each	**£0·42**	**0·43**	**0·47**	**0·50**	

Diameter	10	15	20 cm	
Std. pack qty.	24	12	6	
Std. pack	**£11·55**	**10·05**	**6·35**	*jx*
Each	**£ 0·55**	**0·94**	**1·14**	

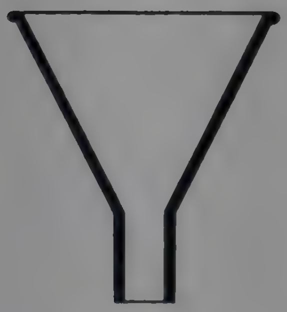
FP-280

FUNNELS, *Pyrex* glass, to BS 1923, precision pressed, with long stem and fluted internally for quick filtering.

Diameter	6·2	7·5	10 cm	
Std. pack qty.	24	24	24	
Std. pack	**£9·75**	**10·05**	**13·05**	*jx*
Each	**£0·47**	**0·49**	**0·62**	

FP-290

FUNNEL, Willstätter filter, AG, borosilicate glass with glass nail to support filter paper disks of approximately 15 mm diameter. Nominal capacity 5 ml, overall length with nail 100 mm, fitted with 14/15 drip end cone joint ... ... Ten **£12·60** Each **£1·40** *ax*


FP-300

FP-300

FUNNEL, *Pyrex* glass, with short stem for powders. Top diameter, 7·5 cm.
Std. pack of 12 **£6·15** Each **£0·57** *jx*

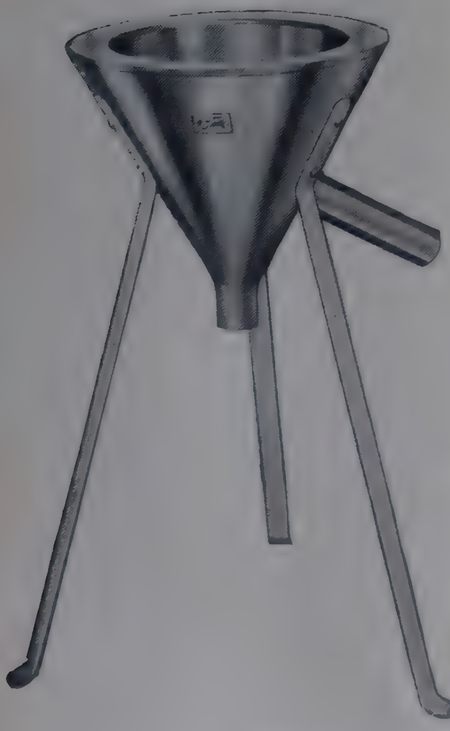
FUNNEL HEATERS

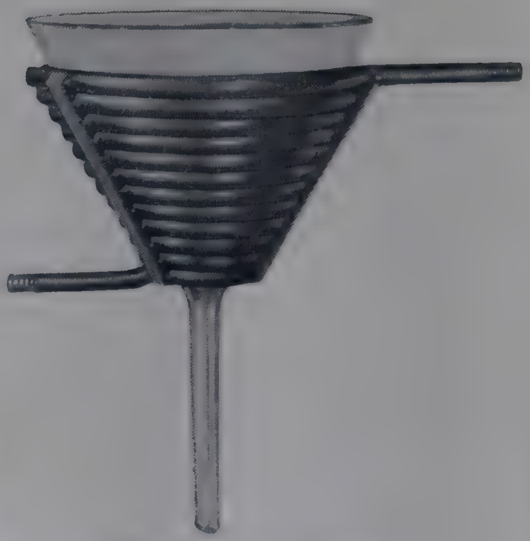
FP-310

FUNNEL HEATER, hot water, double wall copper supported on three legs. To take, but not supplied with, 15 cm diameter glass funnel ... ... Each **£17·30** *cx*

FP-314

FUNNEL HEATER, steam, constructed from lead tubing. To take, but not supplied with, 15 cm diameter glass funnel ... ... Each **£6·40** *cx*


FP-310


FP-314 with 15 cm glass funnel

FUNNEL heaters, *Electrothermal*
see HEATING MANTLES
FUNNEL holders } see STANDS AND CLAMPS
FUNNEL stands }
FUNNELS, weighing see WEIGHING ACCESSORIES

PLASTICS FUNNELS

FP-322

FUNNELS, polypropylene, with external ribs.

Diameter	4	6·3	9	11·5 cm	
Ten	**£0·40**	**0·50**	**0·78**	**1·50**	cx
Each	**£0·13**	**0·13**	**0·15**	**0·22**	

Diameter	14	16·5	19 cm	
Ten	**£2·00**	**2·70**	**3·70**	cx
Each	**£0·27**	**0·33**	**0·43**	

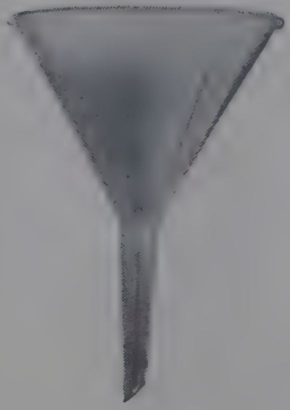
For properties of plastics materials see page 542

STAINLESS STEEL FUNNELS

FP-370

FUNNELS, stainless steel, with handle.

Diameter	160	205	255 mm	
Each	**£7·70**	**9·20**	**11·00**	cx



FP-322

FP-370

BUCHNER and HIRSCH FUNNELS

FP-460

FUNNEL, slit sieve Buchner, *Pyrex* glass. With glass disk, of 6 cm diameter, sealed-in above the stem.

Std. pack of 4 **£6·40** Each **£1·70** *jx*

***FP-470**

FUNNELS, Buchner, rigid polythene, made in two pieces to allow ease of cleaning.

For papers dia.	7	9	11	15	24 cm	
Each	**£0·90**	**1·60**	**2·35**	**3·80**	**8·20**	mx

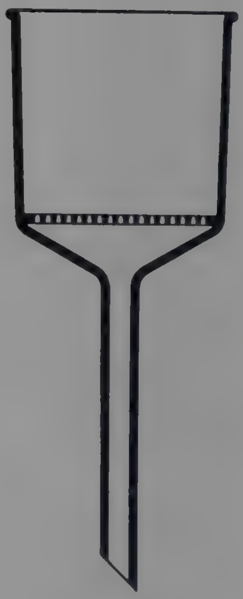
Buchner type funnels, polypropylene and stainless steel see page 234.

FP-485

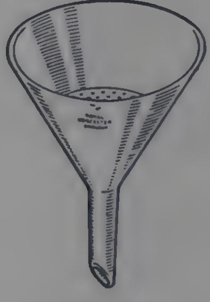
FUNNELS, Hirsch, *Royal Worcester* porcelain.

Top diameter	18	30	43	60 mm	
Filter plate diameter	8	8	11	20 mm	
Ten	**£3·25**	**4·30**	**5·60**	**6·30**	mx
Each	**£0·39**	**0·48**	**0·62**	**0·70**	

For *SintAGlass*, Hirsch funnels see FD-603 and FM-923 et seq. in List No. sequence.



FP-460



FP-485

FP-470
(shown in two pieces)

FP-495

FUNNELS, Buchner, *Royal Worcester* porcelain, with perforated plate.

Top dia.	65	82	105	125 mm	
For papers dia.	5·5	7	9	11 cm	
Each	**£1·02**	**1·35**	**1·90**	**2·45**	mx

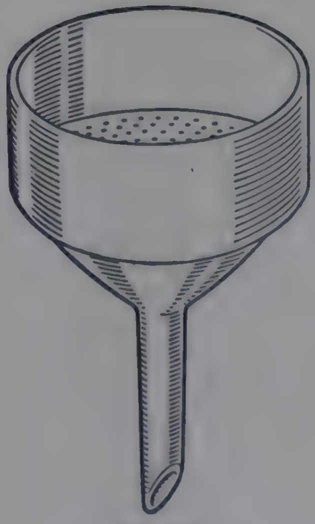
Top dia.	168	220	275 mm	
For papers dia.	15	18·5	24 cm	
Each	**£5·30**	**6·40**	**14·00**	mx

FP-510

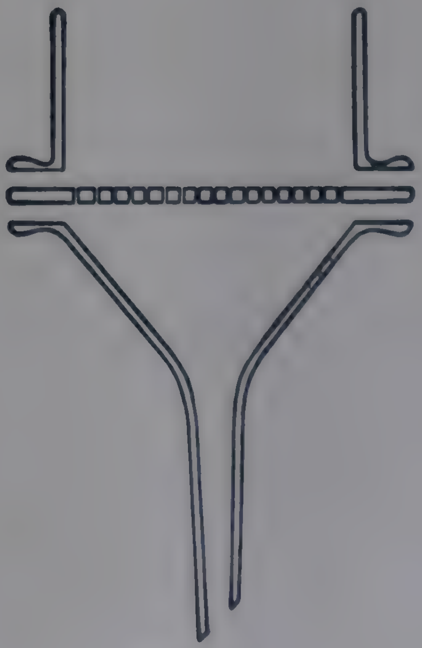
FUNNELS, Buchner, Hartley 3-section pattern, *Royal Worcester* porcelain.

Top dia.	65	80	93	116	144 mm	
For papers dia.	9	11	12·5	15	18·5 cm	
Each	**£2·10**	**2·90**	**3·40**	**4·40**	**5·20**	mx

Flask adapter for use with FP-460 and some sizes of FP-495 and FP-510—see CW-722 in List No. sequence.



FP-495



FP-510

SEPARATING FUNNELS

SPHERICAL OR PEAR SHAPE

FP-541

FUNNELS, spherical, separating, (AG), to BS 2021 Type 1A with interchangeable polypropylene stopper, borosilicate glass.

Capacity	50	100	250	500	1000 ml	
Joint size	19/17	19/17	24/20	24/20	29/22	
Ten	**£13·00**	**14·80**	**17·00**	**21·00**	**26·50**	*ax*
Each	**£ 1·45**	**1·65**	**1·90**	**2·35**	**2·95**	

FP-543

FUNNELS, spherical, separating, (AG), as FP-541 but fitted with **interchangeable stopcock**, borosilicate glass.

Capacity	50	100	250	500	1000 ml	
Ten	**£16·00**	**17·00**	**22·00**	**23·00**	**29·00**	*ax*
Each	**£ 1·80**	**1·90**	**2·45**	**2·55**	**3·20**	

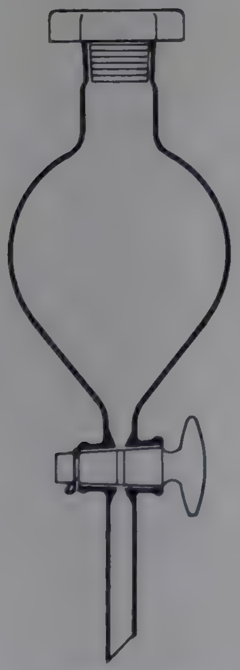
FP-546

FUNNELS, spherical, separating, (AG), as FP-541 but fitted with **ptfe stopcock.**

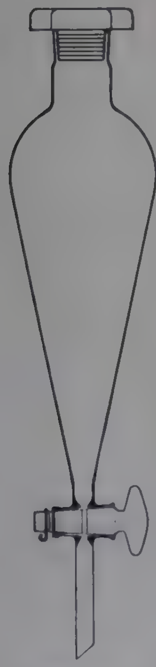
Capacity	50	100	250	500	1000 ml	
Ten	**£24·00**	**26·00**	**27·50**	**30·00**	**35·00**	*ax*
Each	**£ 2·65**	**2·90**	**3·10**	**3·30**	**3·90**	

ACCESSORIES

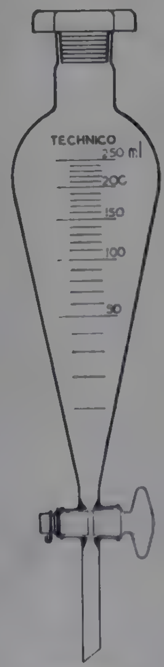
SU-520	**STOPPERS,** hollow blown glass, suitable for use in above separating funnels. For prices see entry in List No. sequence.



FP-541
FP-543



FP-551
FP-553



FP-554

FP-548

FUNNELS, spherical, separating, to BS 2021 Type 1A, *Pyrex* glass, with interchangeable glass stopper.

Capacity	50	100	250	500 ml	
Joint size	19/26	19/26	24/29	24/29	
Std. pack qty.	6	6	6	6	
Std. pack	**£14·05**	**14·30**	**15·45**	**15·80**	*jx*
Each	**£ 2·55**	**2·60**	**2·80**	**2·85**	

Capacity	1000	2000	5000 ml	
Joint size	29/32	34/35	34/35	
Std. pack qty.	4	2	2	
Std. pack	**£12·20**	**7·80**	**12·00**	*jx*
Each	**£ 3·30**	**4·00**	**6·20**	

SEPARATING FUNNELS

CONICAL SHAPE

FP-551

FUNNELS, conical, separating, (AG), to BS 2021 Type 2A with interchangeable polypropylene stopper, borosilicate glass.

Capacity	50	100	250	500	1000 ml	
Joint size	19/17	19/17	24/20	24/20	29/22	
Ten	**£13·80**	**14·80**	**17·50**	**23·00**	**28·50**	*ax*
Each	**£ 1·55**	**1·65**	**1·95**	**2·55**	**3·20**	

FP-553

FUNNELS, conical, separating, (AG), as FP-551 but fitted with **interchangeable stopcock,** borosilicate glass.

Capacity	50	100	250	500	1000 ml	
Ten	**£19·00**	**20·00**	**22·00**	**24·00**	**31·00**	*ax*
Each	**£ 2·15**	**2·25**	**2·45**	**2·65**	**3·40**	

FP-554

FUNNELS, conical, separating, *Technico*, as FP-551 but **graduated.**

Capacity	100	250 ml	
Ten	**£31·00**	**32·00**	*ax*
Each	**£ 3·40**	**3·60**	

FP-556

FUNNELS, conical, separating, (AG), as FP-551 but fitted with **ptfe stopcock.**

Capacity	50	100	250	500	1000 ml	
Ten	**£24·00**	**25·00**	**27·50**	**31·00**	**37·00**	*ax*
Each	**£ 2·65**	**2·80**	**3·10**	**3·40**	**4·10**	

ACCESSORIES

SU-520	**STOPPERS,** hollow blown glass, suitable for use in above separating funnels. For prices see entry in List No. sequence.

FP-558

FUNNELS, conical, separating, to BS 2021 Type 2A, *Pyrex* glass, with interchangeable glass stopper.

Capacity	100	250	500	1000	2000 ml	
Joint size	19/26	24/29	24/29	29/32	34/35	
Std. pack qty.	6	6	6	4	2	
Std. pack	**£12·55**	**14·05**	**14·40**	**10·85**	**7·50**	*jx*
Each	**£ 2·25**	**2·55**	**2·60**	**2·90**	**3·90**	

DROPPING FUNNELS
CYLINDRICAL SHAPE

FP-570

FUNNELS, cylindrical, dropping, open top, (AG), borosilicate glass.

Capacity	25	50	100	250 ml	
Ten	**£8·20**	**8·40**	**9·00**	**12·40**	*ax*
Each	**£0·92**	**0·94**	**1·00**	**1·40**	

NR-220

FUNNEL cylindrical, dropping, with long offset delivery stem, see entry in List No. sequence.

FP-581

FUNNELS, cylindrical, dropping, (AG), to BS 2021 Type 3 with interchangeable polypropylene stopper, borosilicate glass.

Capacity	25	50	100	250	500	1000 ml	
Joint size	14/15	19/17	19/17	24/20	24/20	29/22	
Ten	**£11·60**	**12·60**	**13·60**	**15·00**	**21·00**	**26·00**	*ax*
Each	**£ 1·30**	**1·40**	**1·50**	**1·70**	**2·35**	**2·90**	

FP-583

FUNNELS, cylindrical, dropping, (AG), as FP-581 but fitted with **interchangeable stopcock,** borosilicate glass.

Capacity	25	50	100	250	500	1000 ml	
Ten	**£16·00**	**16·50**	**18·00**	**20·00**	**23·00**	**29·00**	*ax*
Each	**£ 1·80**	**1·85**	**2·00**	**2·25**	**2·55**	**3·20**	

FP-584

FUNNELS, cylindrical, dropping, *Technico,* as FP-581 but **graduated.**

Capacity	50	100	250	500	1000 ml	
Ten	**£17·00**	**17·50**	**23·50**	**28·00**	**35·00**	*ax*
Each	**£ 1·90**	**1·95**	**2·60**	**3·10**	**3·90**	

FP-587

FUNNEL, cylindrical, dropping, (AG), with 14/15 socket and 14/15 drip end cone. Nominal capacity 30 ml, overall length 21 cm, borosilicate glass. Without stopper.
Ten **£24·50** Each **£2·70** *ax*

ACCESSORIES

SU-520 **STOPPERS,** hollow blown glass, suitable for use in above dropping funnels. For prices see entry in List No. sequence.

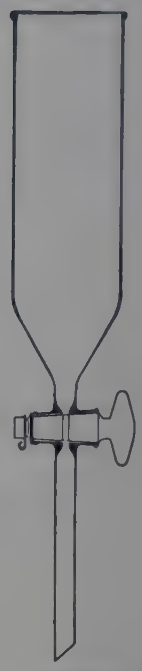
THISTLE FUNNELS

FP-650

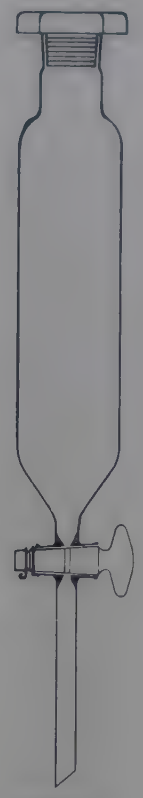
FUNNEL, thistle, (AG), soda-lime glass, with straight stem. Overall length 30 cm.
Ten **£1·40** Each **£0·21** *ax*

FP-660

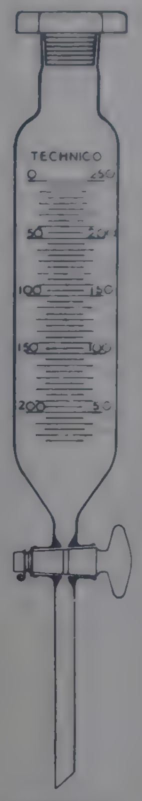
FUNNEL, thistle, (AG), as FP-650 but with bend and two bulbs. Overall length, 30 cm.
Ten **£7·80** Each **£0·86** *ax*



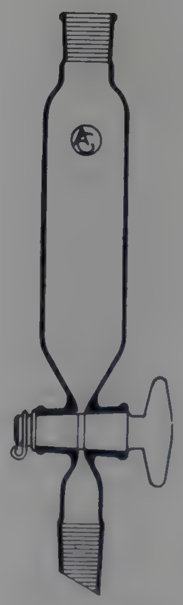
FP-570



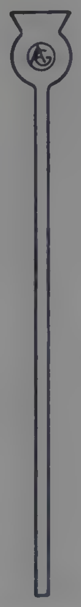
FP-581
FP-583



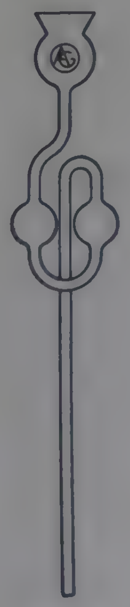
FP-584



FP-587



FP-650



FP-660

SEPARATING AND DROPPING FUNNELS with standard joint cone on stem see QUICKFIT Section.

Gallenkamp LABORATORY FURNACES

Gallenkamp furnaces are tested using methods recommended in BS 4309.

The wide range of furnaces which we offer includes types to suit practically all laboratory applications. The outstanding performance and reliability of each furnace results directly from our use of modern methods and materials and our design and production experience accumulated since 1914 when we started manufacturing.

- Furnaces are designed for safe and reliable operation at the published maximum temperature.
- Furnaces are, whenever practicable, self-contained with all controls and accessories necessary for efficient operation built into non-corroding asbestolite cases.
- All furnaces are robustly constructed and are efficiently thermally insulated.
- Thermal fuses and other safety devices are fitted where stated to prevent damage by accidental over-heating.

FURNACE SECTION INDEX

List No.	Description	Maximum temperature	Internal dimensions	Controls	Page
FR-510	Muffle furnace, wire wound	1100°C	10 × 12·5 × 15 cm	Manual	259
FR-600/614	Muffle furnaces, wire wound	1100°C	8 × 15 × 23·5 cm 13·5 × 19 × 38 cm 20 × 23 × 46 cm	Manual or automatic	260
FR-645	Box furnace, wire wound	1250°C	15 × 15 × 30 cm	Automatic	262
FR-720/721	Box furnaces, silicon carbide elements	1400°C	10 × 12·5 × 18 cm	Manual	263
FR-740/741	Box furnaces, silicon carbide elements	1400°C	10 × 15 × 30 cm 15 × 23 × 38 cm	Automatic	264
FR-770	Box furnace, molybdenum disilicide elements	1500°C	18 × 18 × 32 cm	Automatic	265
FS-212/215	Tube furnaces, wire wound	1200°C	30 × 3·8 cm	Manual	266
FS-300	Tube furnace, silicon carbide elements	1400°C	15 × 3 cm	Manual	267
FS-400	Tube furnaces, molybdenum disilicide elements	1500°C	27 × 3·9 cm 32 × 8 cm	Automatic	268
FS-900	Carius furnace	300°C	7 × 3 cm	Manual	269
FT-110	Crucible furnace, gas heated	1000°C	—	—	269

Gallenkamp LABORATORY FURNACES

TECHNICAL INFORMATION

HEATING ELEMENTS

Wire-wound heating elements

Wire-wound muffle and tube furnaces and box furnaces with internal spiralled wire elements, utilise high quality resistance wires. Suitable materials for these wires were selected only after extensive life tests and many years of experience have confirmed the designs of the elements.

Silicon carbide heating elements

Silicon carbide elements are capable of attaining high temperatures without the need for a protective atmosphere. They are made in the form of a tube, the centre of which has a helical slot to form a higher resistance heating zone.

The rate of increase of electrical resistance at about 1400°C is 15 to 20% in 1000 hours. This low ageing rate together with efficient furnace design enables furnaces which use these elements to be used reliably at temperatures up to 1400°C. All designs permit quick and easy replacement of elements when necessary.

Some models are offered with built-in **element economiser transformers** which can be adjusted to increase the voltage on the heating elements as they age. For an initial extra cost less than that of a set of replacement elements, the useful life of each set of elements may be substantially increased.

Molybdenum disilicide heating elements

These elements are of molybdenum disilicide, modified by the addition of metallic and ceramic materials to provide a highly refractory material ideally suited for furnace heating elements. They can be heated to 1600°C in air for extended periods with little increase in electrical resistance. This high operating temperature enables furnaces to be constructed having a good heating rate and capable of operation up to 1500°C with minimum element deterioration. Molybdenum disilicide elements are unsuitable for routine operation below 1000°C. Box and tube furnaces fitted with molybdenum disilicide elements have established an excellent reputation for reliability at high temperatures.

Owing to the low resistivity of molybdenum disilicide and to the fact that heating elements of this material are manufactured with a relatively large cross-section, these elements must be operated on low voltage/high current supplies from tapped transformers. These transformers are supplied as standard equipment with all *Gallenkamp* molybdenum disilicide element furnaces.

CONSTRUCTION

Outer cases are constructed from corrosion resistant asbestolite panels with smooth surfaces. Highest grade refractory and insulating materials are used throughout. Doors are light alloy castings, efficiently insulated and accurately counterpoised or mounted for easy movement between stable open and closed positions. The refractory linings of doors on larger furnaces radiate away from the operator when opened. Exterior fittings such as hearth-shelves are strong alloy castings. On furnaces operating up to 1100°C, thermocouples are chromel-alumel and for higher temperatures they are platinum-13% rhodium platinum.

TEMPERATURE CONTROL

To ensure that control methods, circuits and safety equipment on furnaces are the most modern and satisfactory at reasonable cost, regular exhaustive tests are made on new equipment which becomes available. The three principal controls used on *Gallenkamp* furnaces are:—

1. **Manual control** (by energy regulator).

This is the least expensive method of control, and although very simple, it can provide a good performance over long periods. For example the total temperature drift can be as small as ±5degC over 24 hours. An energy regulator approximately compensates for moderate fluctuations in mains voltage, and is quite adequate for many laboratory applications. The operating setting is found by trial and error, and temperature stabilisation and recovery are slow (unless the regulator is adjusted). A temperature drift results from significant changes in ambient temperature such as may be caused by draughts.

2. **Automatic ON/OFF control** (by ON/OFF controller and energy regulator).

Using this type of control, the disadvantages of manual control are largely overcome. The working temperature rises rapidly to the value set on the calibrated scale, recovery after loading the furnace is brisk and accurate, and the effects of ambient temperature changes are negligible. Temperature fluctuations due to the cycling of the controller are minimised by use of the energy regulator.

These considerations, and the ease with which the temperature may be set, frequently justify the additional cost of automatic on/off control.

3. **Automatic proportional control** (by proportional controller and where necessary energy regulator).

This type of control is the most accurate standard form fitted to *Gallenkamp* furnaces. Two types of instrument are used, the 'blind' controller with an independent indicator pyrometer and the indicating controller which gives continuous read-out of furnace temperature.

With both types, the pointer has merely to be set on the scale and the controller takes over completely. As with the simpler on/off control, the furnace recovers briskly and is independent of ambient temperature and supply voltage fluctuations. With automatic proportional control, however, the mean energy input is gradually reduced as the required temperature is approached, thus reducing temperature overshoot and fluctuations. It is strongly recommended wherever stringent temperature control is essential. An energy regulator is, in certain furnaces, retained to permit control of heating and cooling rates when this also is desirable.

SAFETY DEVICES

1. Thermal fuses

These are precious metal wires which are looped in the furnace interior. They have specific melting points. Should a furnace overheat, the fuse will melt and this switches off the current to the heater.

2. Safety circuits

All automatic controllers fail safe and have thermocouple breakage devices which protect the furnace by switching it off in the event of a break in the thermocouple circuit.

3. Door switches

In box furnaces where elements at mains voltage are exposed to the furnace interior, a switch operates to switch off the power supply when the door is opened.

FURNACE APPLICATIONS

MUFFLE FURNACES
used in

Fuel Testing
Food Science
Metallurgy
Chemistry
Glass Manufacture

Paint Technology
Medicine

Dentistry
Mineralogy
Ceramics Production
General Industrial Applications

for

Metal melting
Alloying
Tempering and hardening of tools
Precipitate drying and ignition
Assaying

Inorganics in paints and resins
Heat treatment of metals
Fusions
Annealing of glass and metals

Sintering
Decoration and glazing of ceramics
Ash determination
Incineration and ignition

BOX FURNACES
used in

Chemistry
Cement Testing

Glass Manufacture
Fuel Testing

Metallurgy
Ceramics Production

for

Enamelling
Annealing prior to hot forming or drawing

Ceramic firing
Fusions
Tempering
Glass melting

Case hardening of steels
Silica in cement
Heat treating tools and piece parts

TUBE FURNACES
used in

Cement Testing
Fertiliser Industry

Metallurgy
Ceramics Production
Chemistry

Organic Analysis
Fuel Testing

for

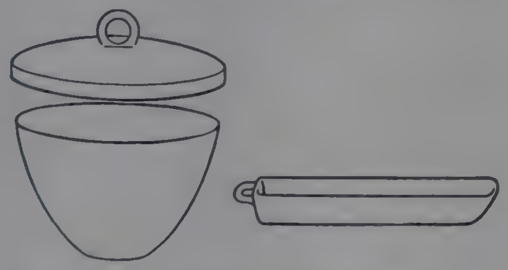
Carbon and sulphur in steels
Fusion of coal ash
Tempering

Elemental analyses of organic substances
Heat treatments of metals in controlled atmospheres

General combustion analyses
Hydrogen, chlorine, sulphur, nitrogen in compounds

ACCESSORIES FOR SAMPLE HANDLING

- To contain particulate samples in muffle and tube furnaces.

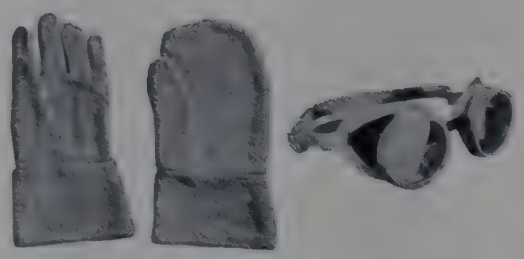


See page headings Boats and Crucibles

- For large samples and piece parts in muffle furnaces.

See page headings Tongs and Trays

- For operator protection.



See page heading Clothing, Protective

ACCESSORIES FOR FURNACE OPERATION

- For remotely switching furnace supplies ON or OFF.

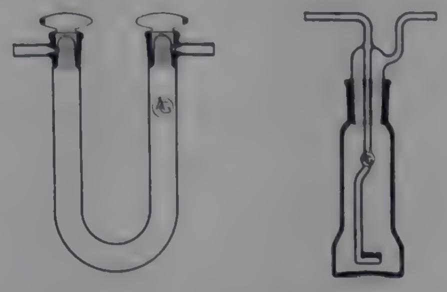
See page heading Time Switches

- For temperature measurement.

°C
Gallenkamp

See page heading Pyrometry

- For gas scrubbing and absorption.



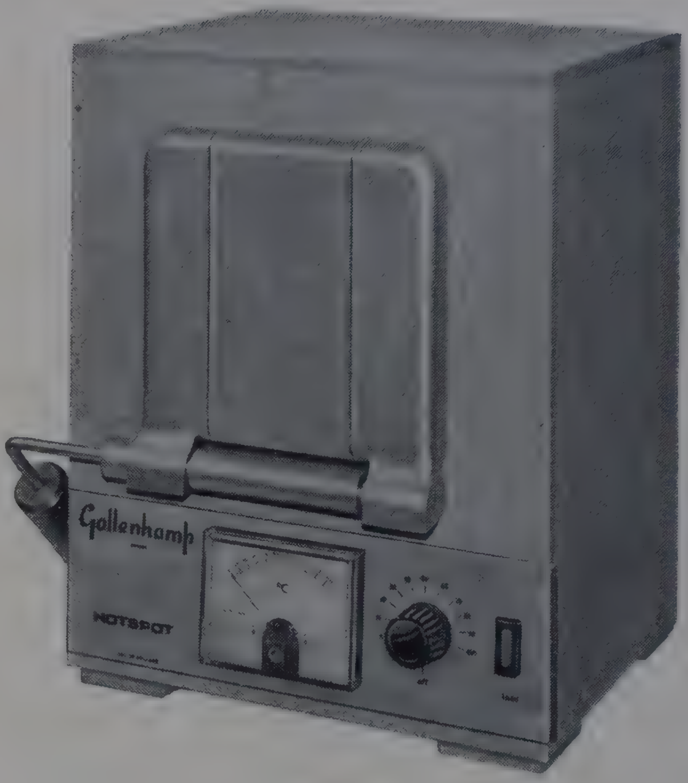
See page headings Absorption and Gas Washbottles

Gallenkamp 'HOTSPOT' MUFFLE FURNACE, 1000°C or 1100°C

WIRE-WOUND HEATING ELEMENTS
MANUAL CONTROL

A compact bench furnace for general laboratory purposes.

- **Heating to 1000°C in under one hour**
- **Fluctuation less than 3degC**
- **Built-in automatic cold junction temperature compensation**
- **Cast muffle provides smooth interior**



FR-510

This furnace may be operated at temperatures up to 1000°C or for limited periods between 1000°C and 1100°C. A 1000°C thermal fuse to protect the heating element is supplied fitted to every furnace; for working up to 1100°C this must be replaced by the accessory thermal fuse FR-535.

DIMENSIONS

	H × W × D
Internal	10 × 12·5 × 15 cm
Overall	39 × 35 × 30 cm
Base	30·5 × 24·5 cm
Weight, net	23 kg
Maximum power rating	1500W

For additional technical information refer to page 257.

FR-510

MUFFLE FURNACE, 'HOTSPOT', *Gallenkamp*, **manual control, for 1000°C** with energy regulator, 8 cm scale indicating pyrometer and **thermal fuse.** For single phase a.c. supplies.

For 220/240V	Each	**£117·00**	*bx*
For 200/210V	Each	**£120·00**	*bxN*
For 110/120V	Each	**£120·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

FR-522	**Wound muffle**		Each	**£12·00**	*bx*
FR-527	**Thermal fuse, 1000°C,** assembly comprising fuse wire, insulators and terminations.	Five **£6·00**	Each	**£1·30**	*bx*
FR-531	**Outer protecting sheath,** for thermal fuse.		Pack of 3	**£2·10**	*bx*
FR-532	**Thermocouple element,** with insulators.		Each	**£1·20**	*bx*

ACCESSORIES

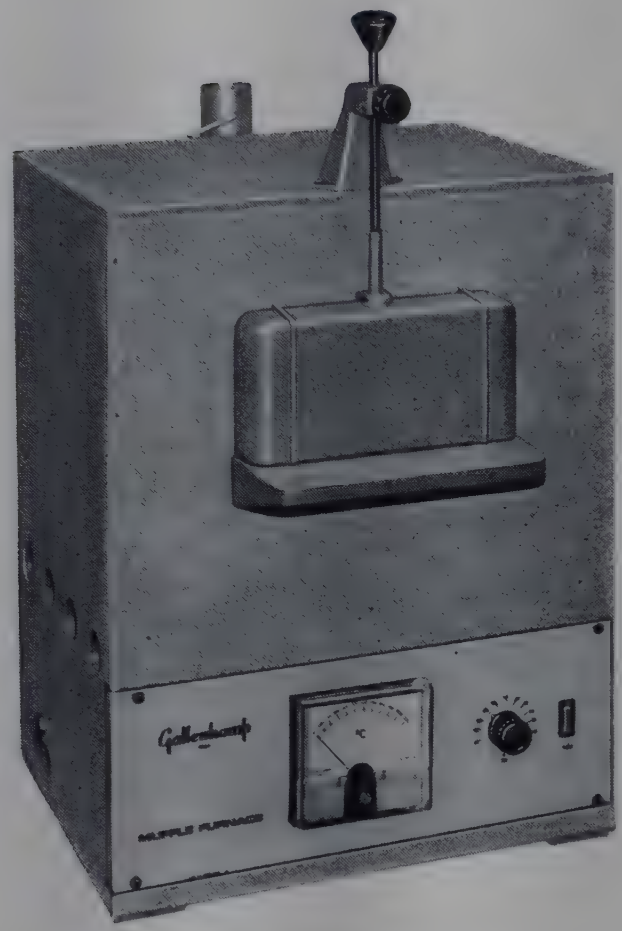
FR-535	**Thermal fuse, 1100°C,** assembly comprising fuse wire, insulators and terminations.	Five **£15·00**	Each	**£3·20**	*bx*
TU-540	**Tray,** silica, 67 × 114 mm. For price see entry in List No. Sequence.				

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

FR-510 showing door open

Gallenkamp GENERAL PURPOSE

REGD TRADE MARK



FR-600

A range of muffle furnaces in three sizes with three alternative forms of control suitable for laboratory or tool room use. These furnaces may be operated at temperatures up to 1000°C or for limited periods between 1000°C and 1100°C when fitted with accessory thermal fuse supplied.

- **Heating to 1000°C in 1½ hours**
- **±2degC control with proportional controller**
- **Draught control chimneys fitted at rear**
- **Thermal fuses easily replaced**

Fuses

To avoid damage by overheating to the heater windings or workpieces, every furnace is fitted with a 1000°C thermal fuse. For operation to 1100°C this must be replaced with the interchangeable accessory thermal fuse FR-624, which is supplied with every furnace. Factory assembled replacement thermal fuses require only inserting and connecting.

Doors

All three sizes are offered with swing-up doors and the two smaller sizes can be supplied with the alternative slide-and-lock doors which are recommended if the furnaces are to be used for ashing or similar work requiring large airflows. All doors open with hot surfaces away from the operator.

For additional technical information refer to page 257.

FURNACES WITH SLIDE-AND-LOCK DOORS

FR-600

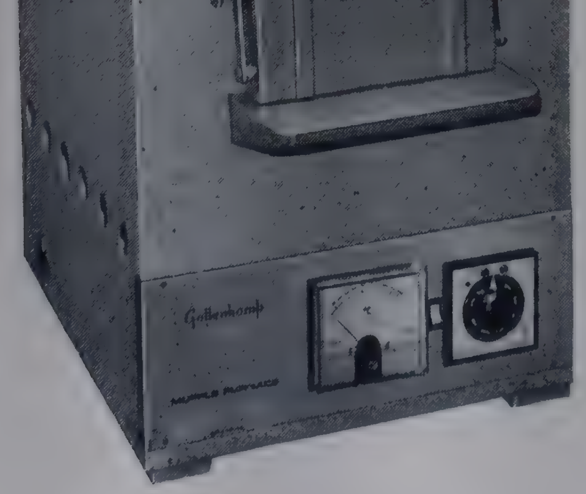
MUFFLE FURNACES, *Gallenkamp*, **manual control, for 1000°C/1100°C,** with slide-and-lock door, 8 cm scale pyrometer indicator, power relay and 1000°C thermal fuse. One accessory 1100°C thermal fuse supplied. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£179·00**	**208·00**	*bx*
For 200/210V	Each	**£189·00**	**222·00**	*bxN*
For 110/120V	Each	**£189·00**	**222·00**	*bxN*

FR-602

MUFFLE FURNACES, *Gallenkamp*, **automatic proportional control, for 1000°C/1100°C,** with slide-and-lock door, solid state controller calibrated in °C, separate push switch operated 8 cm scale pyrometer for occasional reading of furnace temperature, power relay and 1000°C thermal fuse. One accessory 1100°C thermal fuse supplied. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£205·00**	**234·00**	*gx*
For 200/210V	Each	**£215·00**	**248·00**	*gxN*
For 110/120V	Each	**£215·00**	**248·00**	*gxN*



FR-612

FR-604

MUFFLE FURNACES, *Gallenkamp*, **automatic indicating proportional control, for 1000°C/1100°C,** with slide-and-lock door, solid state 13 cm scale combined indicator/controller calibrated in °C which provides continuous indication of furnace temperature, power relay and 1000°C thermal fuse. One accessory 1100°C thermal fuse supplied. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£255·00**	**284·00**	*gx*
For 200/210V	Each	**£265·00**	**298·00**	*gxN*
For 110/120V	Each	**£265·00**	**298·00**	*gxN*

When ordering please state voltage and frequency of supply.

MUFFLE FURNACES, 1000°C/1100°C

WIRE-WOUND HEATING ELEMENTS
MANUAL OR AUTOMATIC CONTROL

DIMENSIONS

Size No.	1	2	3	
	H W D	H W D	H W D	
Internal	8·3 × 15 × 23·5	13·5 × 19 × 38	20 × 23 × 46	cm
Overall	76 × 51 × 50	84 × 51 × 67	100 × 65 × 79	cm
Base	44·5 × 33·5	44·5 × 49	48·5 × 57·5	cm
Weight, net	50	80	125	kg
Maximum power rating	2	3·5	5	kW

For suitable TRAYS—see TU-540 in List No. sequence.

FURNACES WITH SWING-UP DOORS

FR-610

MUFFLE FURNACES, *Gallenkamp,* **manual control, for 1000°C/1100°C,** with swing-up door, 8 cm scale pyrometer indicator, power relay and 1000°C thermal fuse. One accessory 1100°C thermal fuse supplied. For single phase a.c. supplies.

Size No.	1	2	3	
For 220/240V	£186·00	215·00	283·00	bx
For 200/210V	£196·00	229·00	310·00	bxN
For 110/120V	£196·00	229·00	310·00	bxN

All prices each

FR-612

MUFFLE FURNACES, *Gallenkamp,* **automatic proportional control, for 1000°C/1100°C,** with swing-up door, solid state controller calibrated in °C, separate push switch operated 8 cm scale pyrometer for occasional reading of furnace temperature, power relay and 1000°C thermal fuse. One accessory 1100°C thermal fuse supplied. For single phase a.c. supplies.

Size No.	1	2	3	
For 220/240V	£212·00	241·00	303·00	gx
For 200/210V	£222·00	255·00	330·00	gxN
For 110/120V	£222·00	255·00	330·00	gxN

All prices each

FR-614

MUFFLE FURNACES, *Gallenkamp,* **automatic indicating proportional control, for 1000°C/1100°C,** with swing-up door, solid state 13 cm scale combined indicator/controller calibrated in °C which provides continuous indication of furnace temperature, power relay and 1000°C thermal fuse. One accessory 1100°C thermal fuse supplied. For single phase a.c. supplies.

Size No.	1	2	3	
For 220/240V	£262·00	291·00	353·00	gx
For 200/210V	£272·00	305·00	380·00	gxN
For 110/120V	£272·00	305·00	380·00	gxN

All prices each

When ordering please state voltage and frequency of supply.

Gallenkamp
MUFFLE FURNACE

FR-614

REPLACEMENT PARTS

FR-620 **Wound muffles.**

Size No.	1	2	3	
Each	£16·00	32·00	39·50	bx

FR-622 **Thermal fuse, 1000°C,** assembly comprising fuse wire, insulators and terminations.

For furnace Size No.	1	2 and 3	
Five	£6·00	7·20	bx
Each	£1·30	1·55	

FR-624 **Thermal fuse, 1100°C,** assembly comprising fuse wire, insulators and terminations.

For furnace Size No.	1	2 and 3	
Five	£15·50	16·50	bx
Each	£ 3·40	3·60	

FR-626 **Thermocouple element,** with insulators. Each £1·25 bx

FR-628 **Outer protecting sheath,** for thermocouple. Each £1·00 bx

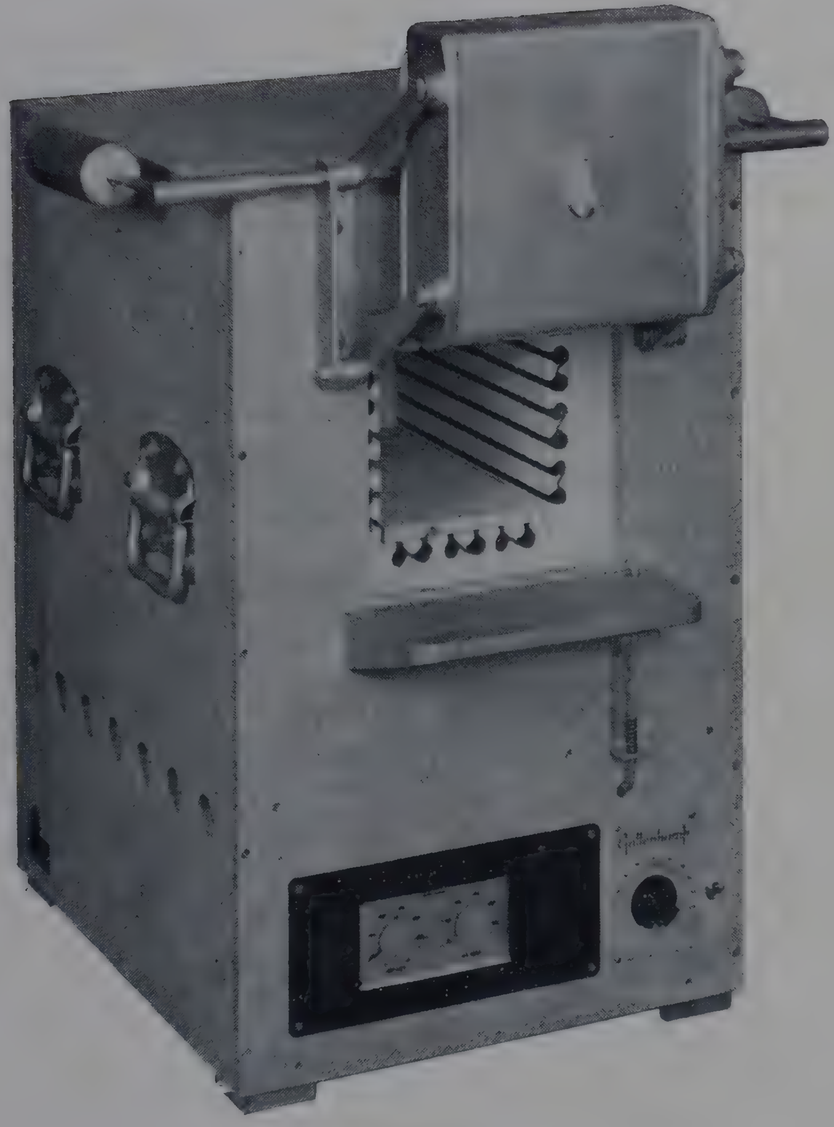
FR-531 **Outer protecting sheath,** for thermal fuse. For price see entry in List No. sequence.

Gallenkamp GENERAL PURPOSE BOX FURNACE, 1250°C

WIRE-WOUND HEATING ELEMENTS
AUTOMATIC CONTROL

Suitable for general applications in laboratories or tool rooms and for small scale ceramic firings.

- **Heating to 1250°C in 2¼ hours**
- **Counterpoised door**
- **Easily replaced heater spirals and thermal fuse**
- **Reliable operation at maximum temperature**



FR-645

Because the elements are exposed to the furnace interior, a switch operates to switch off the power supply as the door is opened. A 1250°C thermal fuse safeguards the furnace from overheating.

DIMENSIONS

	H	W	D	
Internal	15 ×	15 ×	30	cm
Overall	100 ×	64 ×	66	cm
Base		46 ×	55	cm
Weight, net		140 kg		
Maximum power rating		5 kW		

For additional technical information refer to page 257.

FR-645

BOX FURNACE, *Gallenkamp*, **automatic indicating proportional control for 1250°C,** with swing-up counterpoised door, hearth plate, solid state 13 cm scale combined indicator/controller calibrated in °C which provides continuous indication of furnace temperature, power relay, 1250°C thermal fuse and door operated switch. For single phase a.c. supplies.

For 200/250V ... ... Each **£448·00** *gx*

For 110/120V ... ... Each **£454·00** *gxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

FR-660	**Heater spirals,** twelve are required for the furnace. Twelve **£51·00** Each	**£4·80**	*bx*
FR-664	**Hearth plate** ... ... Each	**£3·70**	*bx*
FR-670	**Thermal fuse,** 1250°C working ... Each	**£3·60**	*bx*
FR-672	**Twin bore sleeve,** for thermal fuse. Pack of 5	**£0·75**	*bx*
FR-674	**Outer protecting sheath,** for thermal fuse or thermocouple ... ... Each	**£1·80**	*bx*
FR-676	**Thermocouple element,** with insulators. Each	**£21·00**	*bx*

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

ASBESTOS GLOVES	see	CP-770 et seq.
ASBESTOS SHEET	see	AR-470 et seq.
COMBUSTION BOATS	see	BR-620 et seq.
FURNACE TONGS	see	TS-230 et seq.
HEATING CRUCIBLES	see	CW-210 et seq.

For details and prices see entries in List No. sequence.

Gallenkamp SMALL BOX FURNACES 1400°C

SILICON CARBIDE HEATING ELEMENTS
MANUAL CONTROL

Furnaces for general laboratory work and heat treatment processes.

- **Heating to 1400°C in 2¼ hours**
- **Reliable operation at maximum temperature**
- **Unobstructed access with swing-away door**
- **Optional element economiser transformer**

A micro switch is fitted which disconnects the power supply from the elements as the door opens. A 1400°C thermal fuse safeguards the elements from overheating.

DIMENSIONS

	H	W	D	
Internal	10	×12·5×	18	cm
Overall	61 ×	48 ×	57	cm
Base		51 ×	42	cm
Weight, net		80 kg		
Maximum power rating		3·0 kW		

For additional technical information refer to page 257.

FR-720

BOX FURNACE, *Gallenkamp*, **manual control, for 1400°C,** with energy regulator, 9 cm scale pyrometer indicator and 1400°C thermal fuse. For single phase a.c. supplies.

For 230/240V	Each	**£327·00**	*bx*
For 210/220V	Each	**£332·00**	*bxN*
For 200V	Each	**£332·00**	*bxN*

FR-721

BOX FURNACE, *Gallenkamp*, **manual control, for 1400°C,** as FR-720 and with **element economiser transformer.** For single phase a.c. supplies.

For 230/240V	Each	**£360·00**	*bx*
For 210/220V	Each	**£365·00**	*bxN*
For 200V	Each	**£365·00**	*bxN*

For details of the element economiser transformer see page 257.

When ordering please state voltage to nearest 10V and frequency of supply.

FR-720

REPLACEMENT PARTS

FR-722	**Heating elements,** 10 mm ...	Set of 6	**£39·00**	*mx*
FR-723	**Thermal fuse,** 1400°C working ...	Each	**£3·00**	*bx*
FR-724	**Outer protecting sheath,** for thermal fuse or thermocouple	Each	**£1·70**	*bx*
FR-672	**Twin bore sleeve,** for thermal fuse (two required)	For prices see entries in List No. sequence.		
FS-305	**Thermocouple element,** with insulators			

When ordering replacement elements please state voltage and whether element economiser transformer is fitted.

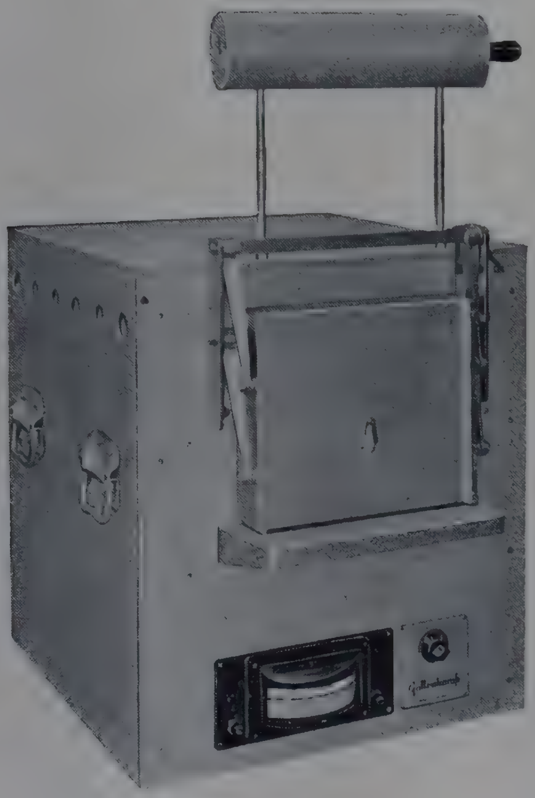
When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

Gallenkamp BOX FURNACES, 1400°C

SILICON CARBIDE HEATING ELEMENTS
AUTOMATIC CONTROL

Furnaces for general laboratory work and heat treatment processes.

- **Heating to 1400°C in under 3 hours**
- **Fluctuation less than 5degC**
- **Reliable operation at maximum temperature**
- **Optional element economiser transformer**
- **Counterpoised doors**



FR-740

Operator and furnace safety are ensured by a door switch, a thermocouple breakage protection circuit, and a 1400°C thermal fuse, each of which disconnects the power supply from the elements.

DIMENSIONS

Size No.	1	2	
	H W D	H W D	
Internal	10 × 15 × 30	15 × 23 × 38	cm
Overall	93 × 57 × 70	102 × 61 × 79	cm
Base	53·5 × 55	61 × 62·5	cm
Weight, net	138	185	kg
Maximum power rating	4·5	7·5	kW

FR-740

BOX FURNACES, *Gallenkamp,* **automatic ON/OFF control for 1400°C** with 13 cm scale controller, energy regulator, door operated safety switch and 1400°C thermal fuse. For single phase a.c. supplies.

Size No.		1	2	
For 230/240V	Each	**£521·00**	**623·00**	*bx*
For 210/220V	Each	**£526·00**	**628·00**	*bxN*
For 200V	Each	**£526·00**	**628·00**	*bxN*

FR-741

BOX FURNACES, *Gallenkamp,* **automatic ON/OFF control for 1400°C,** as FR-740 and with **element economiser transformer.** For single phase a.c. supplies.

Size No.		1	2	
For 230/240V	Each	**£546·00**	**665·00**	*gx*
For 210/220V	Each	**£551·00**	**670·00**	*gxN*
For 200V	Each	**£551·00**	**670·00**	*gxN*

For additional technical information including details of the element economiser transformer see page 257.

When ordering please state voltage to nearest 10V and frequency of supply.

REPLACEMENT PARTS

FR-742 **Heating elements,** 14 mm.

Size No.	1	2	
Set of	6	8	
Per set	**£49·00**	**77·00**	*mx*

FR-744	**Thermal fuse,** for 1400°C working ...	Each	**£4·10**	*bx*
FR-672	**Twin bore sleeve,** for thermal fuse...	For prices see entries in List No. sequence.		
FR-674	**Outer protecting sheath,** for thermal fuse or thermocouple ...			
FR-676	**Thermocouple element,** with insulators			

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

When ordering replacement elements please state voltage and whether element economiser transformer is fitted.

Gallenkamp BOX FURNACE, 1500°C

REGD. TRADE MARK

MOLYBDENUM DISILICIDE HEATING ELEMENTS
AUTOMATIC CONTROL

A box furnace for control and research applications concerned with the behaviour of metals, ceramics and other materials in air at high temperatures.

- **Heating to 1500°C in 6 hours**
- **Fluctuation 5degC**
- **Safe low-voltage heating**

The furnace stands on a control console which houses the temperature controls and the transformer needed to provide the low heater voltages. The switch on the front panel is used to select the heater voltage for particular operating conditions.

Safety Devices

The controller is 'fail safe' and has a thermocouple breakage protection circuit. A 1500°C thermal fuse safeguards the furnace from overheating.

NOTE: Molybdenum disilicide elements are specifically designed for high temperature operation and owing to their nature **this furnace is not suitable for routine operation below 1000°C.**

For additional technical information refer to page 257.

DIMENSIONS

Furnace

	H W D
Working space	18×18×32 cm
Overall	107×84×85 cm
Base	63·5×75 cm
Weight, net	250 kg

Maximum power rating 10 kVA.

Control console

	H W D
Overall	92×63×76 cm
Weight, net	195 kg

FR-770

BOX FURNACE, *Gallenkamp*, **automatic ON/OFF control for 1500°C** with control console, transformer, 13 cm scale controller, energy regulator and 1500°C thermal protection fuse. For 200/250V single phase a.c. supplies ... ... Each **£1010·00** *gx*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

FR-772	**Heating elements.** Four are used in furnace FR-770.	Each **£20·50** *mx*
FR-774	**Thermal fuse,** for 1500°C working ...	Each **£2·20** *bx*
FR-672	**Twin bore sleeve,** for thermal fuse...	For prices see entries in List No. sequence.
FR-674	**Outer protecting sheath,** for thermal fuse or thermocouple ...	
FR-676	**Thermocouple element,** with insulators	

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

FR-770

THE HEAT TREATMENT OF METALS

The use of *Gallenkamp* furnaces for the precision heat treatment of metals has become an accepted practice. A muffle furnace for preheating or for tempering combines ideally with a box furnace for hardening.

Gallenkamp TUBE FURNACES, 1000°C or 1200°C

WIRE-WOUND HEATING ELEMENTS
MANUAL CONTROL

General purpose tube furnaces especially suited to the determination of carbon and sulphur in steel and for other combustion or reduction work requiring horizontal work tubes.

Safety Devices

To prevent damage from accidental overheating, each furnace equipped with an easily replaceable thermal fuse.

Gallenkamp

FS-212
FS-215

DIMENSIONS

Bore	3·8 cm
Length	30 cm
	H W D
Overall	37 × 33 × 23 cm
Base	32·5 × 22 cm
Maximum power rating	1·0 kW
Weight, net	20 kg

For additional technical information refer to page 257.

- **Heating to 1200°C in 1¼ hours**
- **Suitable for use with or without additional work tubes**
- **Built-in thermocouple and pyrometer**

FS-212

TUBE FURNACE, *Gallenkamp,* **manual control, for 1000°C,** with energy regulator, 5·7 cm scale pyrometer indicator, and 1000°C thermal fuse. For single phase a.c. supplies.

For 220/240V	Each	**£91·00**	*bx*
For 200/210V	Each	**£94·50**	*bxN*
For 110/120V	Each	**£94·50**	*bxN*

FS-215

TUBE FURNACE, *Gallenkamp,* **manual control, for 1200°C,** with energy regulator, 5·7 cm scale pyrometer indicator, and 1200°C thermal fuse. For single phase a.c. supplies.

For 220/240V	Each	**£114·00**	*bx*
For 200/210V	Each	**£117·50**	*bxN*
For 110/120V	Each	**£117·50**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

FS-240	**Wound tube refractories,** for FS-212 and FS-215.			
	For 200/210 or 220/240V	Each	**£11·50**	*bx*
	For 110/120V	Each	**£15·00**	*bxN*
FS-249	**Thermal fuse, 1000°C working,** for FS-212.	Each	**£6·00**	*bx*
FS-250	**Thermal fuse, 1200°C working,** for FS-215.	Each	**£13·80**	*bx*
FS-252	**Single bore sleeves,** for thermal fuses.	Pack of 3	**£1·90**	*bx*
FS-254	**Thermocouple element,** with insulators, for FS-212.	Each	**£1·40**	*bx*
FS-256	**Thermocouple element,** with insulators, for FS-215.	Each	**£15·50**	*bx*

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

For combustion boats see BR-620 et seq. in List No. sequence.

For furnace work tubes see FS-860 et seq. in List No. sequence.

Gallenkamp TUBE FURNACES, 1400°C

REGD. TRADE MARK

SILICON CARBIDE HEATING ELEMENTS

MANUAL CONTROL

High temperature horizontal tube furnaces designed particularly for combustion work, including the determination of carbon and sulphur in all types of steel, and sulphur in coal and petroleum products. Also suitable for other tests including Ash Fusion Points and general analysis of organic compounds in various atmospheres.

The furnace is fitted with a platinum : 13% rhodium platinum thermocouple and pyrometer.

Removable covers at either side of the furnace provide easy access to both heating elements and their flexible connectors.

Power to the heating elements is supplied from a four-range step-down transformer which permits the voltage applied across the elements to be increased as their resistance increases due to ageing, and so maximises the useful life of the elements.

- **Heating to 1400°C in under 2 hours**
- **Easily replaceable heating elements**

FS-300

DIMENSIONS

	H	W	D
Bore		3·0 cm	
Heated length		15 cm	
Overall	57 ×	47 ×	36 cm
Base		39·5 ×	32 cm
Maximum power rating		1·25 kW	
Weight, net		77 kg	

For additional technical information refer to page 257.

FS-300

TUBE FURNACE, *Gallenkamp,* **manual control, for 1400°C** with **4-step transformer, energy regulator, and 9 cm scale pyrometer indicator.** For single phase a.c. supplies. **Requires but does not include work tube.**

For 200/250V	Each	**£232·00**	*bx*
For 110/120V	Each	**£233·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

FS-304	**Heating element,** 14 mm dia. Two required.	Each	**£9·00**	*mx*
FS-305	**Thermocouple element,** with insulators.	Each	**£17·00**	*bx*
FS-306	**Outer protecting sheath,** for thermocouple.	Each	**£1·60**	*bx*

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

For combustion boats see BR-620 et seq. in List No. sequence.

For furnace work tubes see FS-860 et seq. in List No. sequence.

Gallenkamp TUBE FURNACE, 1500°C

MOLYBDENUM DISILICIDE HEATING ELEMENTS
AUTOMATIC CONTROL

Gallenkamp

FS-400 without control unit

The step down heater voltage transformer, temperature controller and energy regulator are housed in a separate control console.

DIMENSIONS

Furnace

Size No.	1	2	
Heating chamber length	27	32	cm
Outside diameter of work tube	39	80	mm
	H W D	H W D	
Overall	46 × 53 × 38	53 × 71 × 46	cm
Base	52 × 36	47 × 71	cm
Weight, net	50	120	kg

Control console

	1	2	
	H W D	H W D	
Overall	57 × 57 × 38	57 × 57 × 38	cm
Weight, net	85	140	kg
Maximum power rating	2·5	7·0	kVA

Tube furnaces for research and control applications concerned with the behaviour of materials at high temperature in specific atmospheres. The smaller furnace is especially suitable for the determination of the fusibility of coal ash and coke ash.

- **Heating to 1500°C in 4½ hours**
- **Reliable operation at maximum temperature**
- **Fluctuation about 1degC**

Safety Devices

A thermocouple breakage protection circuit is built into the 'fail-safe' controller and a 1500°C thermal fuse safeguards the furnace from overheating.

NOTE: Molybdenum disilicide elements are specifically designed for high temperature operation and owing to their nature **these furnaces are not suitable for routine operation below 1000°C.**

For additional technical information refer to page 257

FS-400

TUBE FURNACES, *Gallenkamp*, **automatic ON/OFF control, for 1500°C,** with step-down transformer, 13 cm scale controller, energy regulator, and 1500°C thermal fuse. For single phase a.c. supplies. **Requires but does not include work tube.**

Size No.		1	2	
For 200/250V	Each	**£514·00**	**615·00**	*gx*

When ordering please state voltage and frequency of supply.

The maximum power rating of the Size No. 2 furnace is relatively high for single phase electricity supplies. Furnaces can be made for operation on 3-phase supplies—details on request.

REPLACEMENT PARTS

FS-410	**Heating element,** for furnace Size No. 1, one required.	Each **£15·80** *mx*
FS-412	**Heating element,** for furnaces Size No. 2, two required.	Each **£21·50** *mx*
FR-774	**Thermal fuse,** for 1500°C working ...	For prices see entries in List No. sequence.
FR-672	**Twin bore sleeve,** for thermal fuse...	
FR-674	**Outer protecting sleeve,** for thermal fuse or thermocouple	
FR-676	**Thermocouple element,** with insulators	

When ordering replacement parts please state serial number of furnace and voltage and frequency of electricity supply.

For combustion boats see BR-620 et seq. in List No. sequence.

For furnace work tubes see FS-860 et seq. in List No. sequence.

FURNACE WORK TUBES

All dimensions are nominal.

FS-860

FURNACE WORK TUBE, translucent fused silica, for use up to 1050°C with inert or oxidising atmospheres. High thermal shock resistance. Ext. dia. 31 mm, Int. dia. 25 mm, length 610 mm. Each **£4·80** *cx*

FS-865

FURNACE WORK TUBES, impervious aluminous porcelain, for use up to 1500°C with inert or oxidising atmospheres. Moderate thermal shock resistance.

Ext. dia.	28·5	32	46 mm	
Int. dia.	22·5	25·5	38 mm	
Length	660	600	660 mm	
Each	**£5·20**	**5·00**	**7·80**	*cx*

FS-870

FURNACE WORK TUBES, porous fused alumina, for use up to 1700°C with inert, oxidising or reducing atmospheres. High thermal shock resistance.

Ext. dia.	38·5	80 mm	
Int. dia.	28·5	65 mm	
Length	675	825 mm	
Each	**£9·60**	**20·00**	*cx*

FS-875

FURNACE WORK TUBE, impervious fused mullite, for use up to 1700°C with inert or oxidising atmospheres. Moderate thermal shock resistance. Ext. dia. 29 mm, int. dia. 22 mm, length 660 mm. Each **£8·40** *cx*

Gallenkamp CARIUS LOW TEMPERATURE FURNACE, 300°C

The Carius reaction for the determination of sulphur and halogens is known to be hazardous and precautions must be taken to minimise the risk of injury to personnel.

The case is constructed of asbestolite panels and fitted with a hinged front cover which is secured by a screw clamp. Four open ended steel tubes are provided to contain glass reaction tubes. A perforated metal box at the rear and the door are filled with glass wool to reduce the effect should a reaction tube burst. The furnace temperature is controlled by an energy regulator and a thermometer pocket is provided.

DIMENSIONS

Inner steel tubes	29 mm dia. × 69 mm
Overall	41 × 28 × 75 cm
Weight, net	32 kg
Maximum power rating	1 kW

FS-900

CARIUS FURNACE, *Gallenkamp*, with energy regulator, on/off switch and indicator light. For single phase a.c. supplies. **Without thermometer.**

For 220/240V	Each	**£184·00**	*bx*
For 200/210V	Each	**£201·00**	*bxN*
For 110/120V	Each	**£201·00**	*bxN*

When ordering please state voltage and frequency of supply.

FS-900

REPLACEMENT PART AND ACCESSORY

FS-905 **Heating elements** ... ... Set **£2·70** *bx*

FS-907 **Tubes, Carius,** soda-lime glass, closed at one end. Two larger sizes have constriction approx. 50 mm from open end.

Ext. dia. approx.	10	15	25 mm	
Length approx.	350	600	600 mm	
Ten	**£2·00**	**4·50**	**8·60**	*cx*
Each	**£0·26**	**0·50**	**0·96**	

TJ-060 **Thermometer** 0–360°C. For price see entry in List No. sequence.

Gallenkamp GAS HEATED FURNACE, 1000°C

FT-110

CRUCIBLE FURNACE, *Gallenkamp*, **Davies.** Used with a suitable Bunsen burner, this small furnace attains a temperature of 1000°C which is ideal for the reduction, fusion and melting of many metals and alloys. It may also be used for incineration. When not in use as a furnace it will replace an ordinary tripod with the additional advantage that it functions as a flame protector. The furnace comprises a fireclay body insulated with asbestos and contained in a sheet metal jacket which is supported on three braced feet. Suitable for porcelain crucibles of 30 to 46 mm dia. **Without burner** ... ... Each **£7·50** *bx*

ACCESSORIES

CW-210 et seq.	**Crucibles**	For details and prices see entries in List No. sequence.
BX-020	**Burner**	
BX-045	**Burner**	

FT-110

LABORATORY FURNITURE AND FITTINGS

Gallenkamp development and expertise, coupled with continuous close contact with scientists and architects concerned with the needs of every branch of science, have produced the many trend-setting items of laboratory furniture and fittings described in this catalogue. Ever increasing demand and improved productivity have resulted in such equipment becoming available at realistic prices. Timber and plastics faced standard furniture units are manufactured in three main styles of finish, each being obtainable with minor variations to suit six alternative types of bench assembly. This offers eighteen alternative approaches to every design project It will be seen from the illustrations that we have maintained the clean contemporary lines which have distinguished our furniture for many years.

We offer consultation on all matters concerning laboratory design and will assist gladly in the selection of furniture and equipment to suit particular needs. Customers are invited to call at our showroom, or we can arrange a visit by a technical representative.

In addition to the finishes and bench assembly methods listed, we can also supply purpose-made benches and fittings to suit individual requirements.

FX SERIES FURNITURE

Styles of finish

Standard bench units are available to suit any budget, purpose and decor. Furniture can be supplied finished in oak, mahogany or melamine plastics. **Descriptions of styles are given on pages 276/277.**

Types of bench assemblies

Emphasis is placed on flexibility of furniture layout and we supply benches of the static or fully mobile types with varying degrees of mobility between the two extremes. Standard bench units are used for all these applications, with only minor variations to suit whichever type of bench assembly is selected. **Descriptions of types are given on pages 274/275.**

Range of bench units

A full range of 500 mm and 1000 mm width modules is available. **Description and prices are given on pages 278 to 284.**

FUME CUPBOARDS AND EXTRACTION EQUIPMENT

It is recognised that efficient fume extraction equipment is essential in most chemical laboratories. Our current range of controlled and balanced draught fume cupboards is highly resistant to corrosion and easily cleaned and decontaminated. With the more advanced units we supply it is not necessary to have the sash lowered to retain fumes and suitably glazed it can be regarded as a safety screen. We are proud of our achievements in this field and customers are invited to approach us with their problems. **Descriptions of fume cupboards, fans and ducting are given on pages 294 to 305.**

ANCILLARY EQUIPMENT

A full selection of sinks, service taps and fittings are **described on pages 306 to 323.** Miscellaneous items necessary for a comprehensively furnished laboratory are **described on pages 324 to 326.**

IF YOU ARE PLANNING NEW LABORATORIES

a Gallenkamp negotiated contract will provide Free Specialist Consultancy

YOU WILL WANT TO KNOW—

Will the furniture suit the apparatus which will be used?

How much space is necessary for each worker and operation?

What are optimum gangway sizes?

How will instrumentation affect space requirements?

Should plastics faced or timber benches be specified?

Should an open, bay or enclosed plan be adopted?

What are the best materials for benches, services, fume cupboards and exhaust equipment?

Can a laboratory be comprehensively furnished when funds are limited?

Should benches be static, semi-fixed or fully mobile?

What is the best form of space heating in a laboratory?

What should be the sizes of the mains and the diversity factor for each service?

Are heavy duty fume cupboards available for open sash working?

How effectively is conditioned air conserved by balanced-draught fume cupboards?

How should decor be planned?

Can the entire layout be altered, in say a year's time, at small expense?

These questions are illustrative of the many which confront the laboratory designer. No attempt is made here to provide the answers but clients who would like our views on these and similar points are invited to get in touch with the *Gallenkamp* Laboratory Furniture Division.

Not so many years ago it was popularly held that a laboratory project was a simple exercise in joinery, but today it is recognised that the co-ordinated efforts of several specialist designers are necessary if the resulting installation is to be really efficient. Scientists and architects are able to obtain such consultancy at all stages, without charge, by specifying *Gallenkamp* as the nominated contractor. The service includes pre-planning discussions and the preparation of drawings, specification and costs, together with liaison with allied contractors.

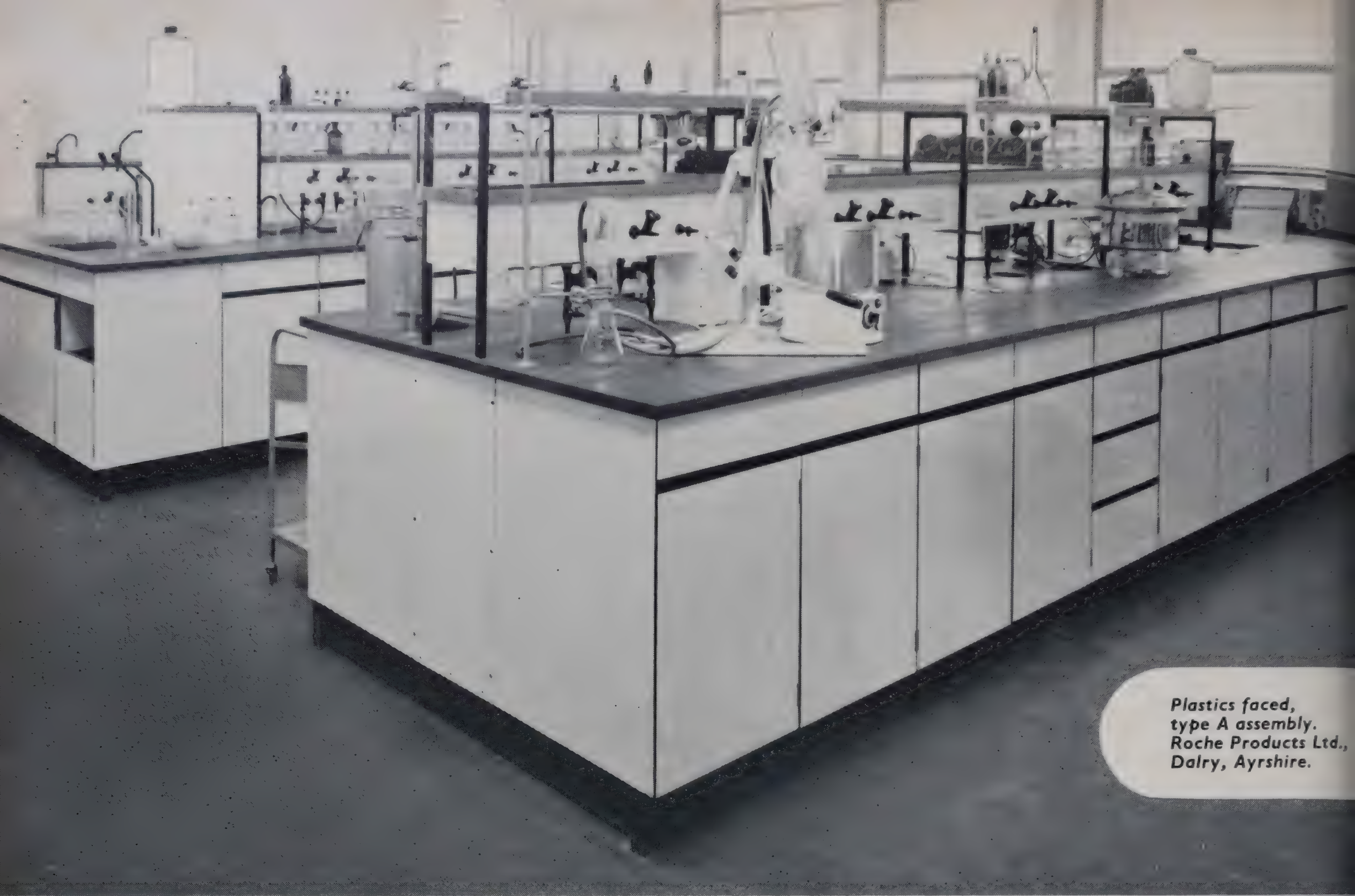
Examine the implications of such an arrangement. The advantage of having a team of specialist designers available is obvious. On the other hand users may feel they are losing the main benefit of competitive tendering—that of accepting the lowest price out of a number of offers. Whilst this is true it is also a fact that *Gallenkamp* frequently enjoy success in competitive tendering by reason of low price and unsuccessful bids are rarely more than a marginal amount above the lowest. It makes no difference whether estimates are competitive or in respect of a negotiated contract—quality and quoted prices do not vary. Thus the user is assured that the negotiated contract will be carried out at a reasonable price, and in return the *Gallenkamp* Laboratory Furniture Division uses its full resources to ensure that the installation is successful in all respects. This company has a long term interest as a supplier to the user and the combination of scientist, architect and nominated contractor is ideal. Projects tackled in this way are certainly among the more successful.

Where competitive tendering is considered necessary, *Gallenkamp* offer a useful service to assist users in the preparation of their specification and drawings, and there are representatives to discuss the details of a scheme before tenders are invited. It is particularly important that the specification sent out to tenderers should be complete in all details as otherwise the user is faced with an extremely difficult task when adjudicating the offers. We have known laboratories spoiled by points in the specification being misinterpreted by lay manufacturers, mistakes not realised until the contract had been awarded purely on the basis of the lowest estimated price. By the time such discrepancies are adjusted the final contract price is possibly by no means the lowest. A correctly framed specification will avoid such trouble.

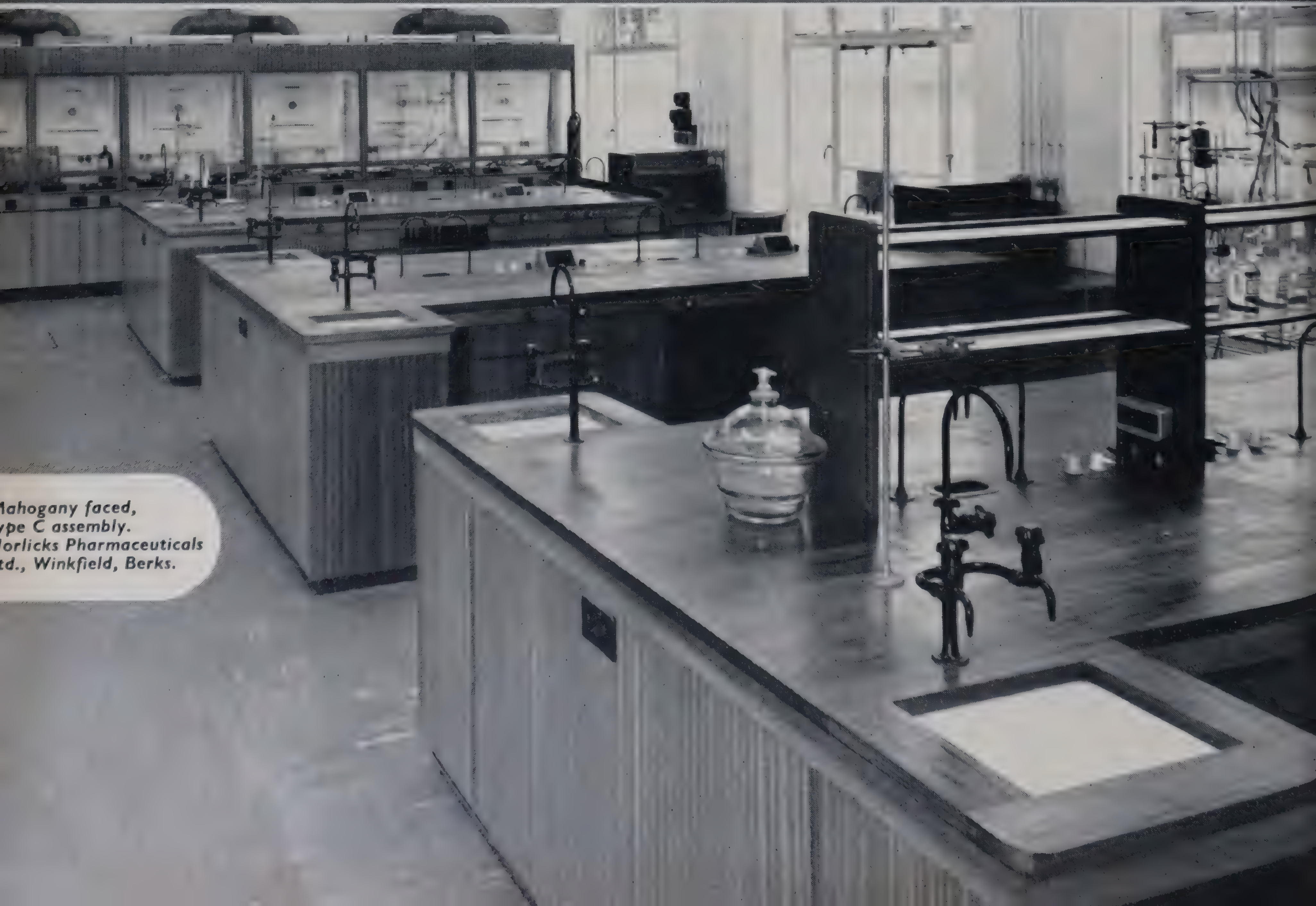
Gallenkamp welcome competitive enquiries but commend the Negotiated Contract system as being particularly worthy of consideration. Only in this way can the accumulated knowledge and experience of many and diverse specialist designers, working with the user and his advisers, be brought fully to bear.

This is an approach too important to be ignored!

Why not investigate it with us?



Plastics faced, type A assembly. Roche Products Ltd., Dalry, Ayrshire.



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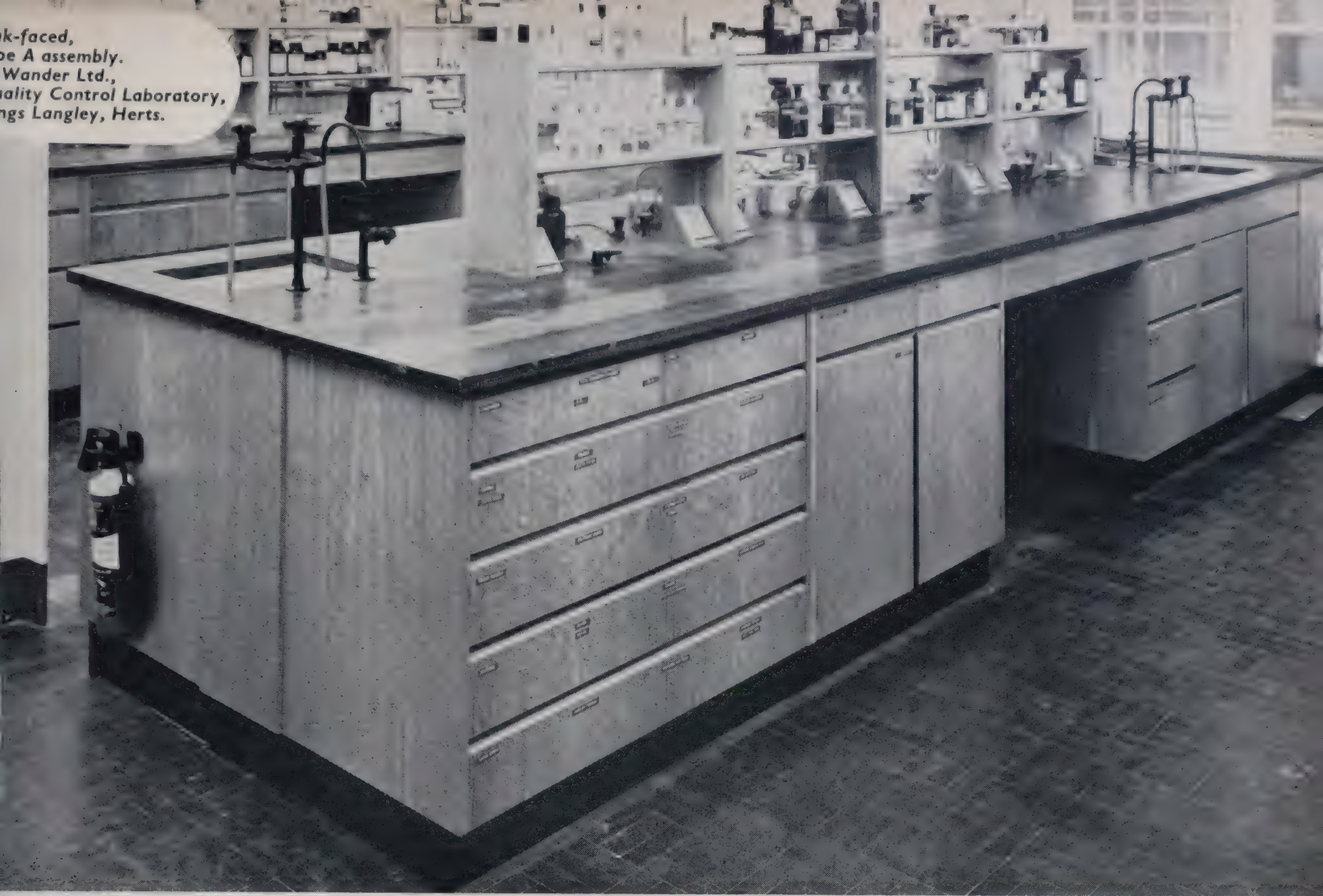

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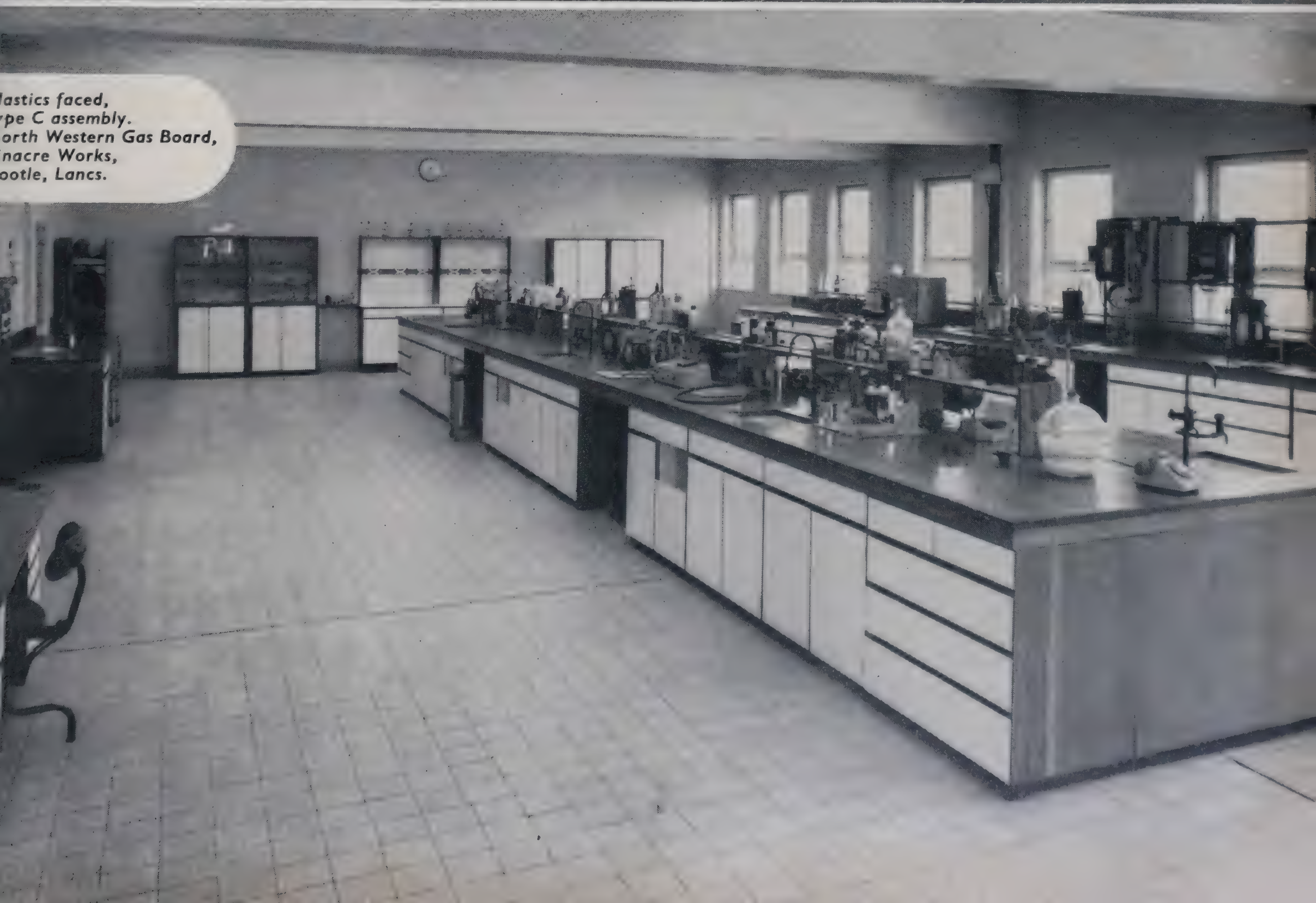

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TYPES OF BENCH ASSEMBLY

(All dimensions are nominal)

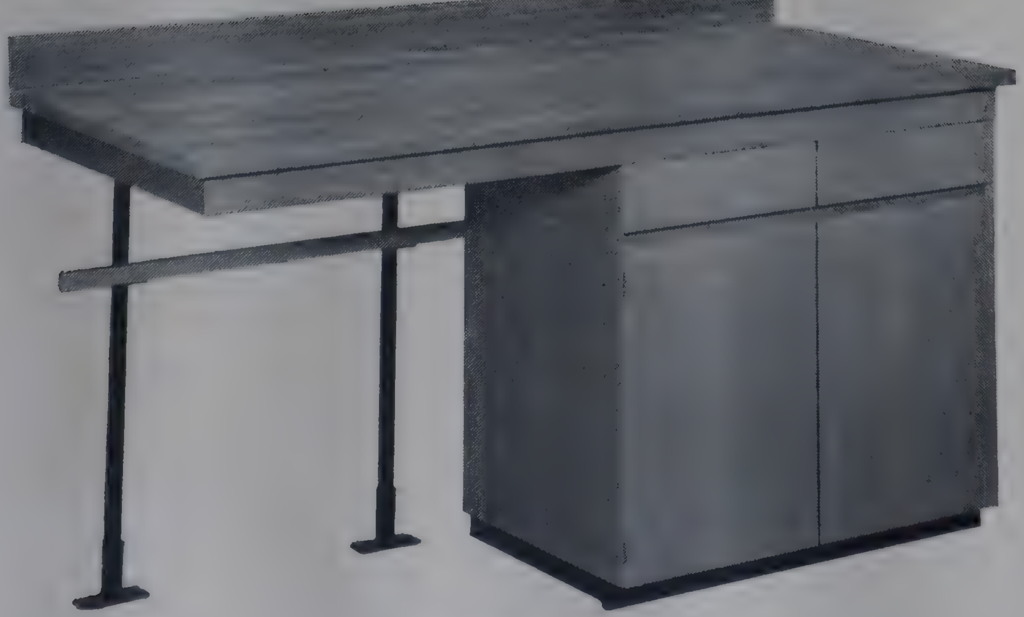
TYPES A and B

TYPE A

The bench top is mounted directly on to the units, which perform the dual functions of storing apparatus and supporting the bench top. Working height is 914 mm. Pipes are mounted either on the walls behind bench units or on the units themselves; in the case of island benches they are run in the service space at the centre. This is the most economical form of bench construction.

TYPE B

The bench top is mounted directly on to the units, as in type A. The working height is 839 mm or 864 mm, as specified. Pipe runs are accommodated exactly as for type A benches.



TYPE C

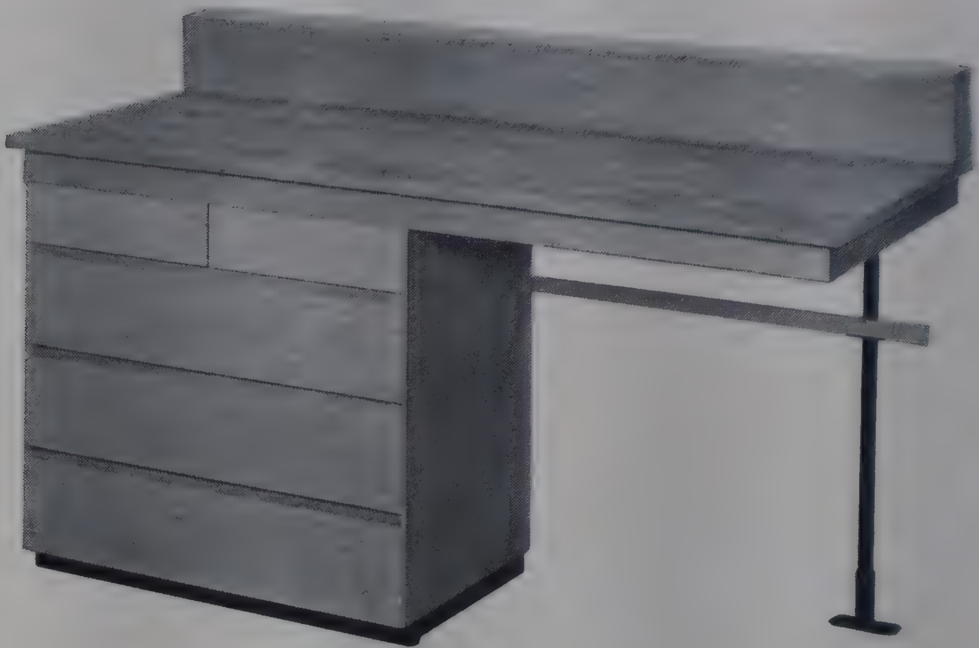
TYPE C

The bench top is mounted independently of the units by means of floor stands provided with integral cantilever brackets. The working height is 914 mm. Bench units can easily be rearranged to suit changing requirements and all units are provided with height adjusters and dust covers. A continuous rail beneath the bench top provides space for mounting remote control taps. Pipe runs are mounted on the floor stands or directly to the wall behind the bench.

TYPES OF BENCH ASSEMBLY

TYPE D

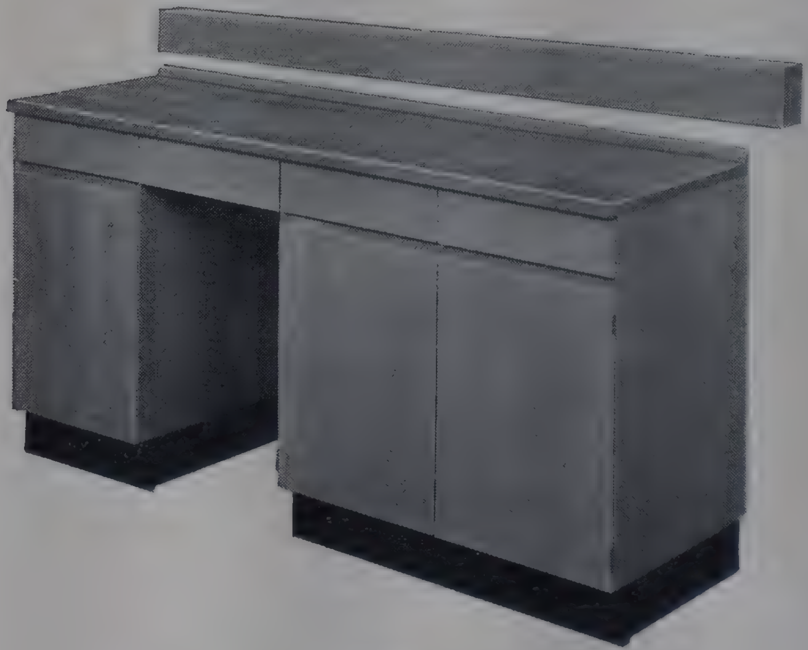
The bench top is mounted in a manner similar to type C but there is the addition of a horizontal service box at the rear. This is particularly useful where bench top cleanliness is a criterion as it is unencumbered by service taps, which are mounted on the riser of the service box. Underbench units are fitted with height adjusters and dust covers.



TYPE D

TYPE E

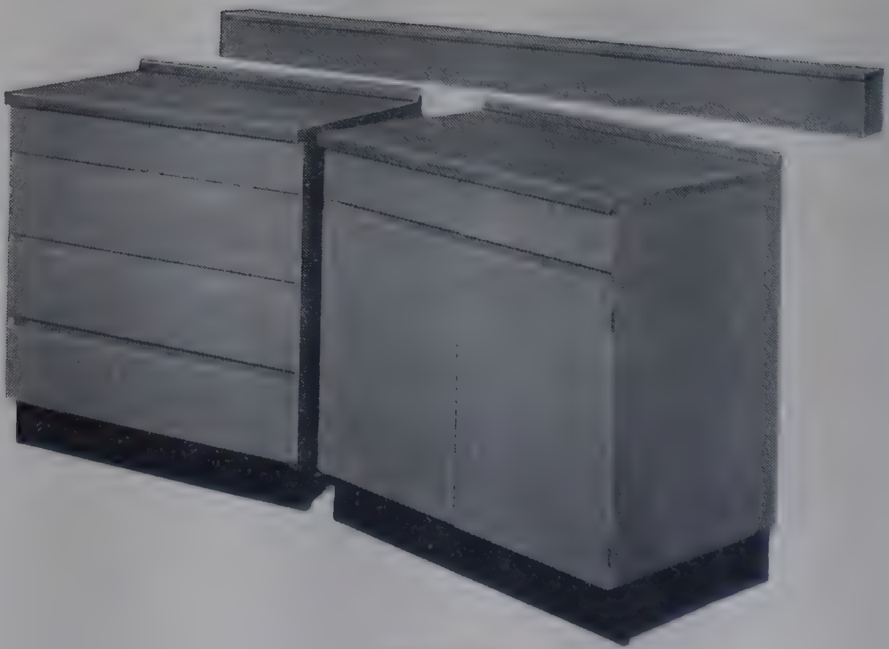
The bench top is mounted directly on to the units but is quite separate from the service box, which runs horizontally at the rear of the bench or at the centre in the case of an island bench. The removable bench can be made to any desired length, but it is usual not to exceed 3000 mm. Working height is 914 mm. Plumbing runs are fixed to the supporting frame assembly which, in the case of a wall bench, is in turn fixed to the wall. For an island bench it is self supporting. Should access be required to the plumbing it is a simple matter to remove the entire bench to expose the services. Underbench units are fitted with height adjusters and dust covers.



TYPE E

TYPE F

The sectional bench top is quite separate from the service box. Each bench unit is provided with an integral and separate working top and sections are butted one to another. Working height is 914 mm. A bench so assembled can be rearranged with little effort. Underbench units are fitted with height adjusters. Bench sections may be removed to give service space to floor standing apparatus.



TYPE F

Gallenkamp FX SERIES BENCH UNITS

(All dimensions are nominal)

- Attractively styled and incorporating the best features of modern practice
- Exposed timber faces finished in natural colour, matt polished
- Veneers are carefully matched to ensure continuity of grain
- Many units are fitted with removable backs for access to service runs

FX101 SERIES — OAK FINISH

Manufactured in module widths of 500 mm and 1000 mm to optimum standards of commercial joinery to provide a range of furniture of the high quality for those requiring a prestige laboratory installation.

Constructed with chipboard ends, doors, and drawer fronts finished in matched veneers. Drawer sides and backs of hardwood, with all joints dovetailed. Drawer and cupboard bottoms of plywood. Finished in natural colour, matt polished, with ebonised plinths. Removable cupboard backs of hardboard. All door and drawer pulls are recessed to give a completely flush exterior.

FX102 SERIES — MAHOGANY FINISH

A reasonably priced range of attractively styled and robustly constructed bench units manufactured in module widths of 500 mm and 1000 mm.

Constructed with chipboard ends, doors, and drawer fronts finished in matched veneers. Drawer sides and backs of hardwood, with all joints dovetailed. Drawer and cupboard bottoms of plywood. Finished in natural colour, matt polished, with ebonised plinths. Removable cupboard backs of hardboard. All door and drawer pulls are recessed to give a completely flush exterior.

Gallenkamp FX SERIES BENCH UNITS

FX103 SERIES — MELAMINE PLASTICS FINISH

Attractively styled and robustly constructed with a decorative appearance which is strictly functional; the units being easily cleaned and decontaminated. Manufactured in module widths of 500 mm and 1000 mm.

Constructed with chipboard ends, veneered both faces in mahogany. Doors and drawer fronts faced with white melamine plastics. Drawer sides and backs of hardwood, with all joints dovetailed. Drawer and cupboard bottoms of plywood. Removable cupboard backs of hardboard. Recessed drawer and door pulls. Ebonised plinths.

FX SERIES BENCH UNITS

Specification variations to suit Assembly Types A to F described on pages 274/275.

All storage units 533 mm deep and either 500 mm or 1000 mm wide.		
Bench Unit for Assembly Type	Bench Unit Height	Bench Unit Specification Variations
A	889 mm	Standard specifications as described on pages 276/277.
B	813 mm or 839 mm	Standard specifications as described on pages 276/277.
C and D	813 mm	Fitted with four height adjusters and with top panelled to form a dust cover.
E and F	889 mm	Fitted with four height adjusters.

Gallenkamp STANDARD BENCH UNITS

FX SERIES

For constructional details, assembly types and heights of units see pages 274 to 277.

All prices are exclusive of bench tops.

FX-111

CUPBOARD AND TWO DRAWER UNIT

1000 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-111	101	Oak	**40·00**	*fxN*
FX-112	102	Mahogany	**40·00**	*fxN*
FX-113	103	Plastics faced	**50·00**	*fxN*

FX-121

FX-131

CUPBOARD AND DRAWER UNIT

500 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-121	101	Oak	**29·00**	*fxN*
FX-122	102	Mahogany	**29·00**	*fxN*
FX-123	103	Plastics faced	**37·00**	*fxN*

CUPBOARD AND SINGLE DRAWER UNIT

1000 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-131	101	Oak	**40·00**	*fxN*
FX-132	102	Mahogany	**40·00**	*fxN*
FX-133	103	Plastics faced	**52·00**	*fxN*

FX-141

CUPBOARD UNIT

1000 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-141	101	Oak	**36·00**	*fxN*
FX-142	102	Mahogany	**36·00**	*fxN*
FX-143	103	Plastics faced	**48·00**	*fxN*

When ordering please specify List No. and assembly type letter (see pages 274 and 275).

Gallenkamp STANDARD BENCH UNITS

FX SERIES

For constructional details, assembly types and heights of units see pages 274 to 277.

All prices are exclusive of bench tops.

FX-151

CUPBOARD UNIT

500 mm wide × 533 mm deep.

List No.	Range	Finish	Each £	
FX-151	101	Oak	**29·00**	*fxN*
FX-152	102	Mahogany	**29·00**	*fxN*
FX-153	103	Plastics faced	**36·00**	*fxN*

FX-161

CUPBOARD UNIT, with low back to accommodate services,

1000 mm wide × 533 mm deep.

List No.	Range	Finish	Each £	
FX-161	101	Oak	**36·00**	*fxN*
FX-162	102	Mahogany	**36·00**	*fxN*
FX-163	103	Plastics faced	**48·00**	*fxN*

FX-171

CUPBOARD UNIT, with low back to accommodate services,

500 mm wide × 533 mm deep.

List No.	Range	Finish	Each £	
FX-171	101	Oak	**29·00**	*fxN*
FX-172	102	Mahogany	**29·00**	*fxN*
FX-173	103	Plastics faced	**36·00**	*fxN*

When ordering please specify List No. and assembly type letter (see pages 274 and 275).

Gallenkamp STANDARD BENCH UNITS

FX SERIES

For constructional details, assembly types and heights of units see pages 274 to 277.

All prices are exclusive of bench tops.

FX-181

NEST OF FIVE DRAWERS UNIT

1000 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-181	101	Oak	53·00	*fxN*
FX-182	102	Mahogany	40·00	*fxN*
FX-183	103	Plastics faced	50·00	*fxN*

FX-191

NEST OF FOUR DRAWERS UNIT

500 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-191	101	Oak	88·00	*fxN*
FX-192	102	Mahogany	88·00	*fxN*
FX-193	103	Plastics faced	93·00	*fxN*

FX-201

NEST OF TWENTY SMALL DRAWERS UNIT

1000 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-201	101	Oak	82·00	*fxN*
FX-202	102	Mahogany	82·00	*fxN*
FX-203	103	Plastics faced	86·00	*fxN*

FX-211

KNEEHOLE TWO DRAWER UNIT

1000 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-211	101	Oak	15·00	*fxN*
FX-212	102	Mahogany	15·00	*fxN*
FX-213	103	Plastics faced	16·00	*fxN*

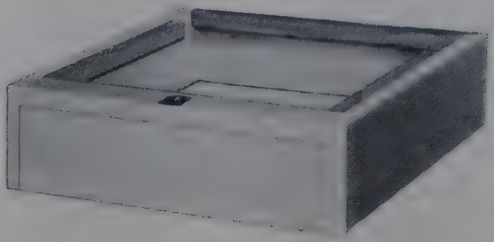
When ordering please specify List No. and assembly type letter (see pages 274 and 275).

Gallenkamp STANDARD BENCH UNITS

FX SERIES

For constructional details, assembly types and heights of units see pages 274 to 277.

All prices are exclusive of bench tops.



FX-221

FX-231

KNEEHOLE DRAWER UNIT

500 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-221	101	Oak	**10·00**	*fxN*
FX-222	102	Mahogany	**10·00**	*fxN*
FX-223	103	Plastics faced	**10·00**	*fxN*

KNEEHOLE RAIL

List No.	Range	Finish	Per 1000 mm run	
			£	
FX-231	101	Oak	**2·50**	*fxN*
FX-232	102	Mahogany	**2·50**	*fxN*
FX-233	103	Plastics faced	**2·50**	*fxN*

FX-241

TABLE AND TWO DRAWER UNIT

1000 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-241	101	Oak	**25·00**	*fxN*
FX-242	102	Mahogany	**25·00**	*fxN*
FX-243	103	Mahogany and Plastics faced	**25·00**	*fxN*

FX-251

TABLE UNIT

1000 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-251	101	Oak	**17·00**	*fxN*
FX-252	102	Mahogany	**17·00**	*fxN*
FX-253	103	Mahogany and Plastics faced	**17·00**	*fxN*

When ordering please specify List No. and assembly type letter (see pages 274 and 275).

Gallenkamp STANDARD BENCH UNITS

FX-271

FX SERIES

For constructional details, assembly types and heights of units see pages 274 to 277.

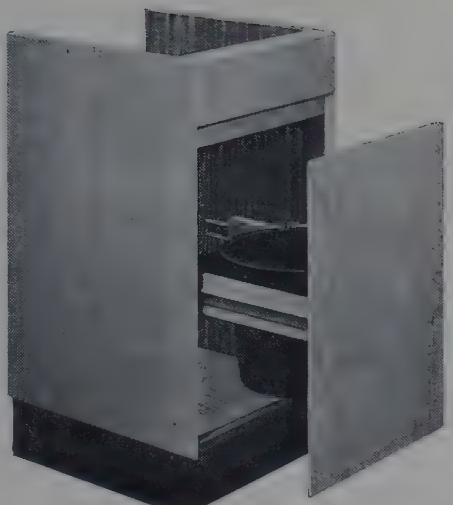
All prices are exclusive of bench tops.

DRYING CUPBOARD UNIT, lined with asbestolite and fitted with three interior heaters and an ON/OFF fused switch. Maximum power rating 180W. For 200/250V a.c. single phase supplies.

500 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-261	101	Oak	**64·00**	*fxN*
FX-262	102	Mahogany	**64·00**	*fxN*
FX-263	103	Plastics faced	**70·00**	*fxN*

FX-261



FX-281

DRYING CUPBOARD UNIT, lined with asbestolite and fitted with three interior heaters and an ON/OFF fused switch. Maximum power rating 360W. For 200/250V a.c. single phase supplies.

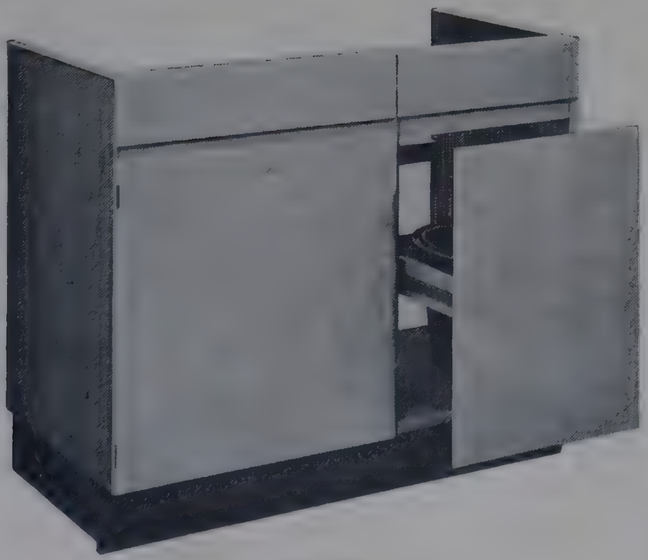
1000 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-271	101	Oak	**78·00**	*fxN*
FX-272	102	Mahogany	**78·00**	*fxN*
FX-273	103	Plastics faced	**86·00**	*fxN*

WASTE BOX UNIT

500 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-281	101	Oak	**38·00**	*fxN*
FX-282	102	Mahogany	**38·00**	*fxN*
FX-283	103	Plastics faced	**44·00**	*fxN*



FX-291

COMBINED CUPBOARD AND WASTE BOX UNIT

1000 mm wide × 533 mm deep.

List No.	Range	Finish	Each	
			£	
FX-291	101	Oak	**57·00**	*fxN*
FX-292	102	Mahogany	**57·00**	*fxN*
FX-293	103	Plastics faced	**70·00**	*fxN*

When ordering please specify List No. and assembly type letter (see pages 274 and 275).

Gallenkamp STANDARD BENCH UNITS

REGD TRADE MARK

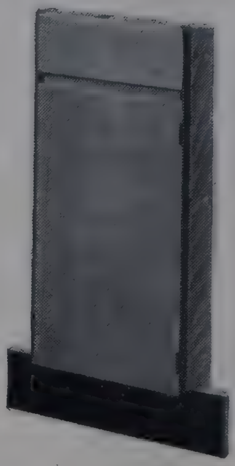
FX SERIES

For constructional details, assembly types and heights of units see pages 274 to 277.

CORNER DOOR UNIT

355 mm wide.

List No.	Range	Finish	Each	
FX-301	101	Oak	£ 9·50	fxN
FX-302	102	Mahogany	9·50	fxN
FX-303	103	Plastics faced	11·00	fxN



FX-301

FRAMED DOOR UNIT

1000 mm wide.

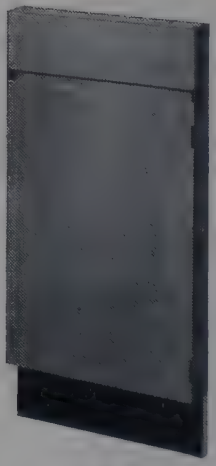
List No.	Range	Finish	Each	
FX-311	101	Oak	£ 18·00	fxN
FX-312	102	Mahogany	18·00	fxN
FX-313	103	Plastics faced	20·00	fxN

FX-311

FRAMED DOOR UNIT

500 mm wide.

List No.	Range	Finish	Each	
FX-321	101	Oak	£ 11·50	fxN
FX-322	102	Mahogany	11·50	fxN
FX-323	103	Plastics faced	13·00	fxN



FX-321

END SERVICE PANEL, wall type.

127 mm wide.

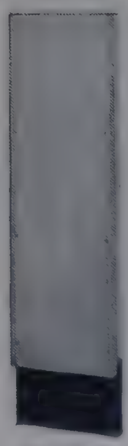
List No.	Range	Finish	Each	
FX-331	101	Oak	£ 2·60	fxN
FX-332	102 103	Mahogany	2·60	fxN

END SERVICE PANEL, island type.

254 mm wide.

List No.	Range	Finish	Each	
FX-341	101	Oak	£ 3·20	fxN
FX-342	102 103	Mahogany	3·20	fxN

FX-331

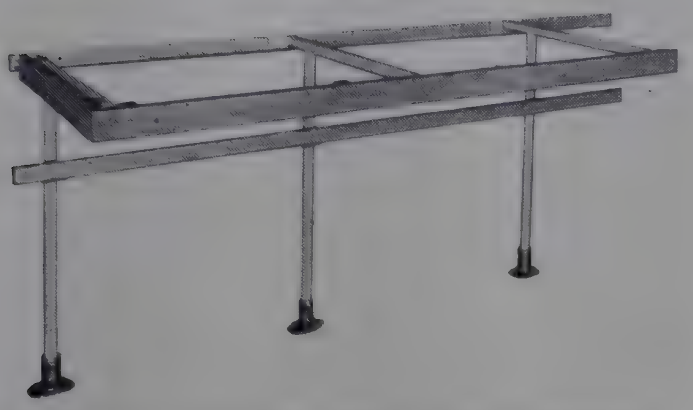


FX-341

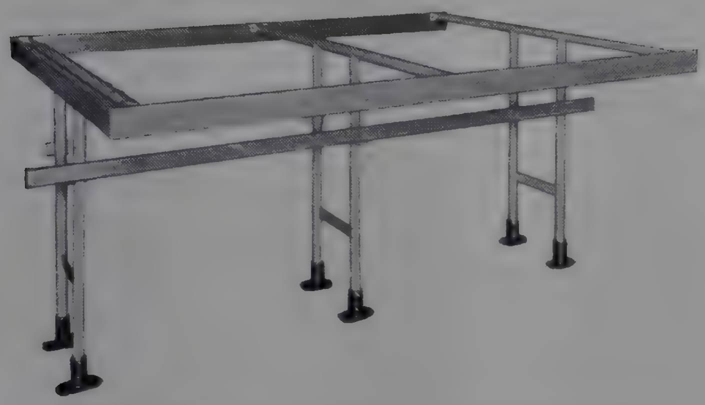
When ordering please specify List No. and assembly type letter (see pages 274 and 275).

Gallenkamp BENCH SUPPORT FRAMES

For use with movable bench assemblies types C and D



Frame support in typical wall assembly

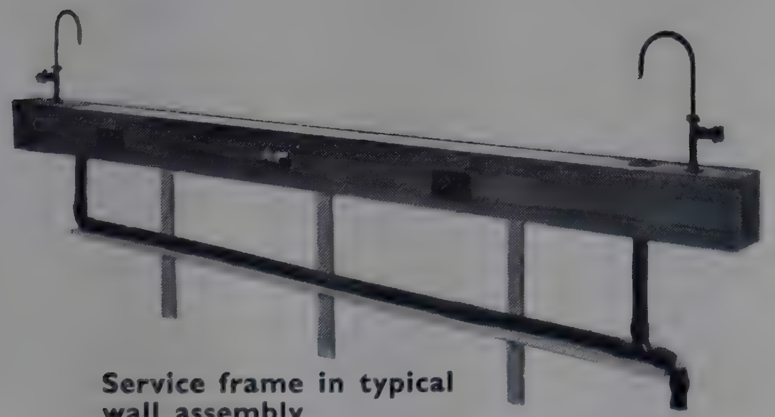


Frame support in typical island assembly

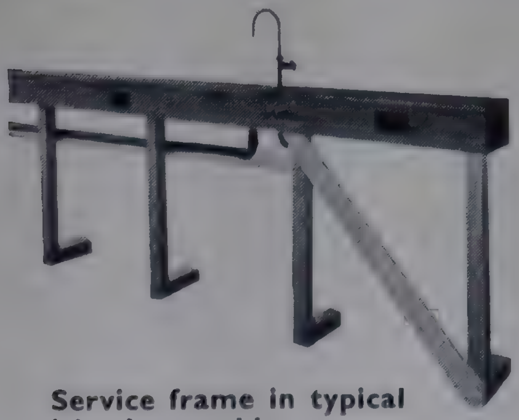
List No.	Description	Unit	Price
FX-400	**WALL BENCH CANTILEVER FRAME SUPPORT,** where both floor and wall fixings are available, 712 mm deep × 889 mm high, finished in epoxy paint.	Each	£7·50 *fxN*
FX-401	**WALL BENCH CANTILEVER FRAME SUPPORT,** where floor fixing only is possible and for single sided island and peninsular benches, 712 mm deep × 889 mm high, finished in epoxy paint	Each	£9·00 *fxN*
FX-402	**ISLAND BENCH CANTILEVER FRAME SUPPORT,** doublesided, 1422 mm deep × 889 mm high, finished in epoxy paint	Each	£11·50 *fxN*
FX-403	**DASH RAIL,** oak or mahogany, 70 mm high.	Per 1000 mm run	£1·15 *fxN*
FX-404	**LAY-BOARD,** for waste pipes, deal, unpolished.	Per 1000 mm run	£0·35 *fxN*
FX-405	**WALL BATTEN,** 51 × 25 mm deal.	Per 1000 mm run	£0·35 *fxN*
FX-406	**BUTTING RAIL,** for carcase units, 25 × 13 mm oak or mahogany	Per 1000 mm run	£0·35 *fxN*
FX-407	**PANELLING,** oak or mahogany veneered plywood to contain plumbing and form return ends. Manufactured to required sizes		Price on application *fxN*

Gallenkamp SERVICE FRAMES

For use with movable bench assemblies types E and F



Service frame in typical wall assembly



Service frame in typical island assembly

Prices given below do not include service fittings and pipes.

FOR WALL BENCHES

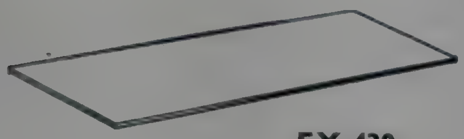
List No.	Description	Unit	Price
FX-412	**SERVICE BOX,** teak, 127 mm deep × 178 mm high.	Per 1000 mm run	£8·50 *fxN*
FX-413	**WALL BATTEN,** with fixing block for service box.	Each	£1·20 *fxN*
FX-404	**LAY-BOARD,** for waste pipes. For price see entry in List No. sequence.		

FOR ISLAND BENCHES

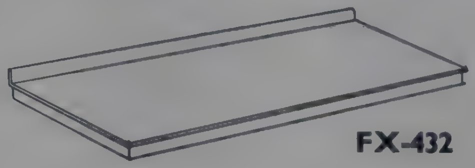
List No.	Description	Unit	Price
FX-415	**SERVICE BOX,** teak, 254 mm deep × 178 mm high.	Per 1000 mm run	£16·00 *fxN*
FX-416	**LEG SUPPORT,** for floor fixing ...	Each	£6·00 *fxN*
FX-404	**LAY-BOARD,** for waste pipes. For price see entry in List No. sequence.		
FX-418	**DIAGONAL BRACE,** for leg support.	Per 1000 mm run	£0·35 *fxN*

BENCH TOPS

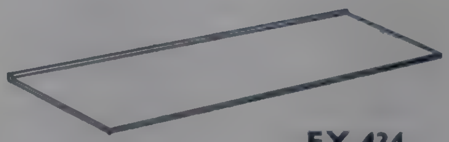
Bench tops can be supplied to suit all purposes. Those in common use are listed. Tops may however be prepared from other materials, and we will gladly assist in selection.



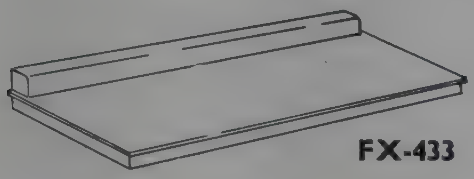
FX-430



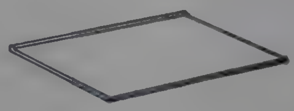
FX-432



FX-434



FX-433



FX-435

MATERIALS

TEAK. 20 mm thick, twice oiled. Exposed edges are rounded at the top and throated on the underside.

IROKO. 20 mm thick, twice oiled. Exposed edges are rounded at the top and throated on the underside.

FORMICA. On face and reverse side of fabricated timber core approximately 20 mm thick. Lipped on exposed edges with teak. The standard colour finish is grey linette, but alternatives will be quoted on request.

TILES. Acid resisting, mounted on 20 mm thick Asbestolite tops.

STAINLESS STEEL. 18 gauge, FMB quality, mounted on a deal batten frame and turned down on edges.

ASBESTOLITE. 20 mm thick with square cut edges. For further technical details see FY-902 et seq.

PVC. 6 mm thick, set on 19 mm blockboard. Exposed edges are lipped with teak.

	Specifications and prices for wall bench tops Prices for island bench tops are approximately double those shown	Approximate prices for 1000 mm run of wall bench top							
		Teak	Iroko	Formica	Tiles	Stainless steel	Asbestolite	PVC	
FX-430	**TOP,** for types A and B benches, 685 mm deep.	£ 20·10	£ 14·20	£ 21·20	Prices on application				*fxN*
FX-432	**TOP,** for type C benches, fitted with skirting and front dash rail FX-403, 762 mm deep.	25·20	19·60	26·70					*fxN*
FX-433	**TOP,** for type D bench, fitted with teak service box and front dash rail FX-403, 762 mm deep overall.	32·00	24·50	33·50					*fxN*
FX-434	**TOP,** for type E bench, fitted with quadrant at rear, 635 mm deep.	20·10	14·20	21·20					*fxN*
FX-435	**UNIT TOP,** for type F bench, fitted with quadrant at rear, 1000 mm wide × 635 mm deep. Each	20·10	14·20	21·20					*fxN*

ANCILLARY FITTINGS

FX-437

HEADING JOINTS, tongued, grooved and bolted. Required when bench runs exceed 2500 mm.

Top material	Teak	Iroko	
Each joint	£2·85	2·85	*fxN*

FX-438

WALL SKIRTING, teak, 100 mm high × 16 mm thick.
Per 1000 mm run £2·10 *fxN*

FX-439

WALL QUADRANT, teak, 25 mm high × 25 mm thick.
Per 1000 mm run £1·05 *fxN*

FX-441

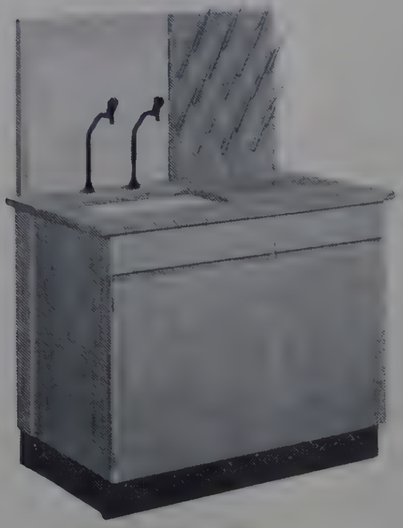
DRAINING BOARD GROOVES, cut into bench top. Each board approximately 460 mm wide.

Top material	Teak	Iroko	
Each	£2·60	2·60	*fxN*

FX-442

SINK HOLES, cut into timber tops. Provided with throatings on the underside ... ... Each £2·45 *fxN*

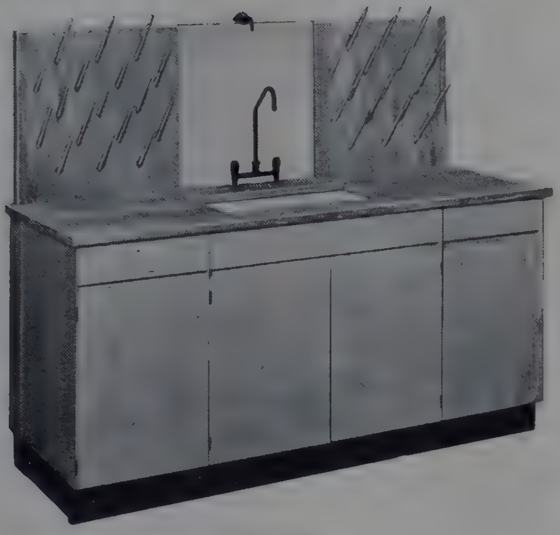
Gallenkamp SINK UNITS



FX-450

FX-450

SINK UNIT, 1051 × 685 × 914 mm high. Teak top FX-430, with a sink hole and draining grooves, set on combined cupboard and waste box unit FX-291, and 2 end panels FX-331. Splashback framed to peg draining rack FY-884. Sink 610 × 456 × 254 mm FY-842, 1 plug FY-858, 2 water taps with standards. **Oak finish.** Each **£146·00** *fxN*



FX-455

FX-455

SINK UNIT, 2051 × 685 × 914 mm high. Teak top FX-430, with a sink hole and draining grooves, set on a waste box unit FX-281, drying cupboard FX-271 with framed doors FX-311 in front of sink, and 2 end panels FX-331. Splashback framed between 2 peg racks FY-884. Sink 762 × 456 × 254 mm FY-842, 1 plug FY-858, 1 hot and cold water mixing tap FY-685, 1 water tap at high level for burette washing FY-659. **Oak finish** ... Each **£187·00** *fxN*

FX-450 and FX-455 can be supplied:

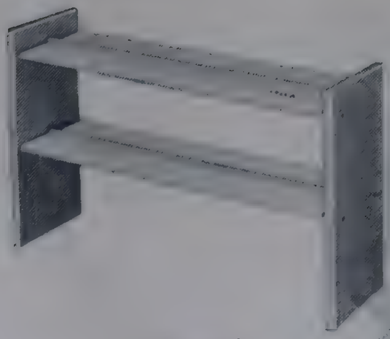
(i) with finish to match mahogany range 102 and plastics faced range 103 bench units.

(ii) with stainless steel bowl and drainers.

Details and prices of modifications on application.

REAGENT BOTTLE SHELVES

FX-460



FX-463

Overall height 533 mm; clearances 229 mm between bench top and first shelf and 216 mm between shelves. With rectangular ends and removable clear glass strip laid full width on shelves.

When ordering please state whether oak or mahogany finish required.

FX-460

REAGENT BOTTLE SHELF, for wall benches, as specification, length 500 mm, depth 115 mm. Each **£10·00** *fxN*

FX-461

REAGENT BOTTLE SHELF, for wall benches, as specification, length 1000 mm, depth 115 mm. Each **£15·00** *fxN*

FX-463

REAGENT BOTTLES SHELF, for island benches, as specification, length 500 mm, depth 230 mm. Each **£14·00** *fxN*

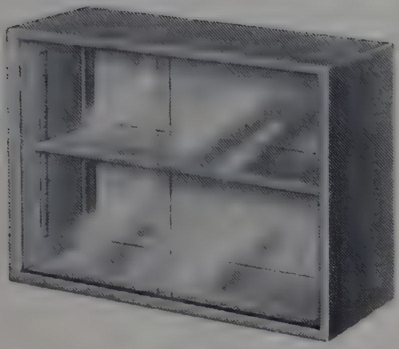
FX-464

REAGENT BOTTLE SHELF, for island benches, as specification, length 1000 mm, depth 230 mm. Each **£19·50** *fxN*

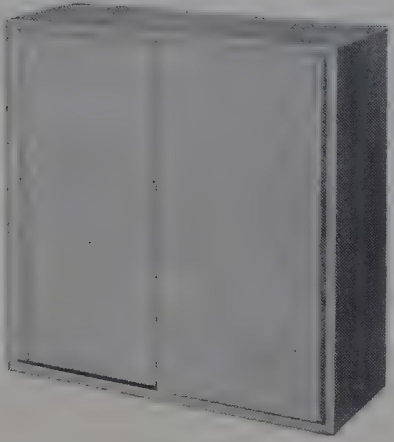
FX-463 and FX-464 can be supplied fitted with boxing for service cables and pipes, etc. Details and prices on application.

Gallenkamp APPARATUS CUPBOARDS

Units are of the stacking type. They can be assembled side by side, back to back, one on top of the other, and mounted on wall or floor.



FX-471



FX-472

FX-475

FX-470

CUPBOARD UNIT, 1000 mm wide × 380 mm deep × 610 mm high, fitted with one adjustable shelf. Enclosed by one pair of sliding oak faced doors. Suitable for wall fixing or mounting on plinth. **Oak finish.** Each **£29·00** *fxN*

FX-471

CUPBOARD UNIT, 1000 mm wide × 304 mm deep × 610 mm high, fitted with one adjustable shelf. Enclosed by one pair of sliding glass doors. Suitable for wall fixing or mounting on plinth. **Oak finish** ... Each **£29·00** *fxN*

FX-472

CUPBOARD UNIT, 1000 mm wide × 380 mm deep × 914 mm high, fitted with two adjustable shelves. Enclosed by one pair of sliding oak faced doors. Suitable for wall fixing or mounting on plinth. **Oak finish.** Each **£37·00** *fxN*

FX-473

CUPBOARD UNIT, 1000 mm wide × 304 mm deep × 914 mm high, fitted with two adjustable shelves. Enclosed by one pair of sliding glass doors. Suitable for wall fixing or mounting on plinth. **Oak finish** ... Each **£37·00** *fxN*

FX-474

PLINTH, mahogany, for floor mounted cupboard unit, 1000 mm wide × 51 mm high ... ... Each **£2·35** *fxN*

FX-475

CUPBOARD ASSEMBLY, 2000 mm wide × 304 mm deep × 941 mm high, comprising 2 units FX-472 mounted on a mahogany plinth FX-474. **Oak finish.** Each **£76·35** *fxN*

FX-476

CUPBOARD ASSEMBLY, 2000 mm wide × 304 mm deep × 941 mm high. Comprising 2 units FX-473 with 1950 mm run oak batten to provide support on wall. **Oak finish** ... ... Each **£74·00** *fxN*

FX-477

CUPBOARD ASSEMBLY, 1000 mm wide × 380 mm deep × 2185 mm high. Comprising 2 units FX-471 mounted on one unit FX-472 with plinth FX-474. **Oak finish** ... ... Each **£97·35** *fxN*

All cupboards can be supplied with finish to match mahogany range 102 or plastics faced range 103 bench units. Prices on application.

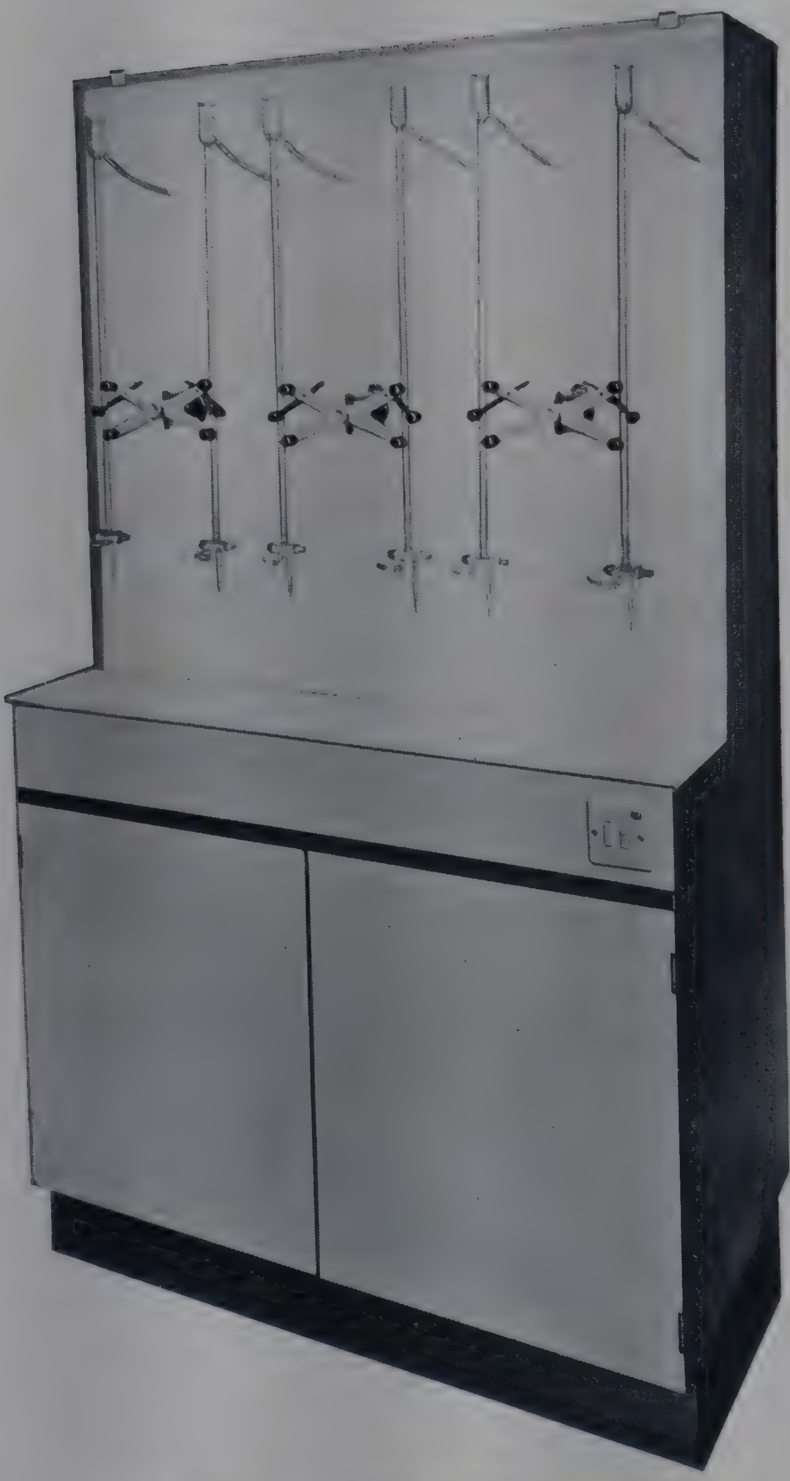
FX-476

FX-477

Gallenkamp TITRATION BENCHES

PNEUMATIC FILLING

- **Accommodates six automatic zero Class B burettes, each to deliver 50 cm³**
- **Automatic filling of each burette from stock bottle by turning double bore stopcock**
- **Alternative models with or without illumination**
- **Burette supply and overflow tubing concealed behind viewing back**
- **PVC tray in base cupboard to hold stock, overflow and air reservoir bottles**
- **Built-in diaphragm pump provides filtered air at steady pressure, controlled by automatic relief valve**
- **Door operated air pressure release valve protects against pressure accidents during servicing**



FX-501 with burettes, glassware and fittings

FX-500

TITRATION BENCH, auto zero, non-illuminated, pneumatic filling, 1000 mm wide × 540 mm deep × 1880 mm high, with opalescent white plastics back and work top. Cupboard fitted with PVC tray to accommodate bottles. Ends of unit externally finished in mahogany with doors and fascia rail white plastics faced. Fitted with air pump with inlet filter, controlled by fascia mounted switch. An air manifold, provided with pressure gauge and 2 valves for door operated release and pressure control, also has nozzles for connection by the user to air reservoir bottle and 6 stock bottles. Three double spring clamps to accommodate 6 burettes are mounted on the viewing back. For 220/240V a.c. supplies.

Each **£156·00** *fxN*

FX-501

TITRATION BENCH, auto zero, 1000 mm wide × 540 mm deep × 1880 mm high, as FX-500 but with translucent plastics back and work top both **illuminated by fluorescent tubes** providing shadowless viewing. For 220/240V a.c. supplies ... ... Each **£189·00** *fxN*

ACCESSORIES

FX-503	**Glassware and fittings,** comprising 13 glass bottles 2500 ml, glass tubes, neoprene stoppers, 30 metre coil vinyl tubing 5 mm bore and instructions for fitting. Set **£11·00** cx
BW-524	**Burettes,** 50 cm³, with automatic zero and double oblique bore stopcock. For price and details see entry in List No. sequence.

NOTE:

Benches FX-500 and FX-501 each require but do not include six burettes BW-524 50 cm³ capacity and one set of glassware and fittings FX-503.

To ensure satisfactory operation FX-503 and the burettes should be ordered with the bench.

Titration benches FX-500 and FX-501 can be supplied with finish to match oak range FX101 or mahogany range FX102 bench units. Prices on application.

Gallenkamp TITRATION BENCHES

GRAVITY FILLING

- **Accommodates six burettes Class A or B each to deliver 50 cm^3**
- **Gravity filling of each burette from stock bottle by turning double bore stopcock**
- **Alternative models with or without illumination**
- **Burette supply concealed behind viewing back**
- **Shelf at top of viewing back to accommodate stock bottles**

FX-510

TITRATION BENCH, gravity filling, non-illuminated. 1000 mm wide × 540 mm deep × 1880 mm high. With opalescent white plastics back and work top. Cupboard provided with timber floor and shelf. Ends of unit externally finished in mahogany with doors and fascia rail white plastics faced. Glass shelf on roof of viewing back to accommodate aspirator stock bottles. Three double spring clamps to accommodate 6 burettes are mounted on the viewing back ... ... Each **£116·00** *fxN*

FX-511

TITRATION BENCH, gravity filling. 1000 mm wide × 540 mm deep × 1880 mm high, as FX-510 but with translucent plastics back and work top both **illuminated by fluorescent tubes** providing shadowless viewing. For 220/240V a.c. supplies ... ... Each **£149·00** *fxN*

ACCESSORIES

FX-515	**Glassware and fittings,** comprising 6 glass aspirator bottles 2000 ml and 8 metres vinyl tubing 5 mm bore.	Set **£28·80** *cx*
BW-134	**Burette,** 50 cm^3, Class B with double oblique bore stopcock	For prices see entries in List No. sequence.
BW-136	**Burette,** 50 cm^3, Class A with double oblique bore stopcock	

NOTE:

Benches FX-510 and FX-511 each require but do not include six burettes 50 cm^3 capacity, either BW-134 or BW-136, and one set of glassware and fittings FX-515.

To ensure satisfactory operation FX-515 and the burettes should be ordered with the bench.

Titration benches FX-510 and FX-511 can be supplied with finish to match oak range FX 101 or mahogany range FX 102 bench units. Prices on application.

VIEWING BACK UNITS

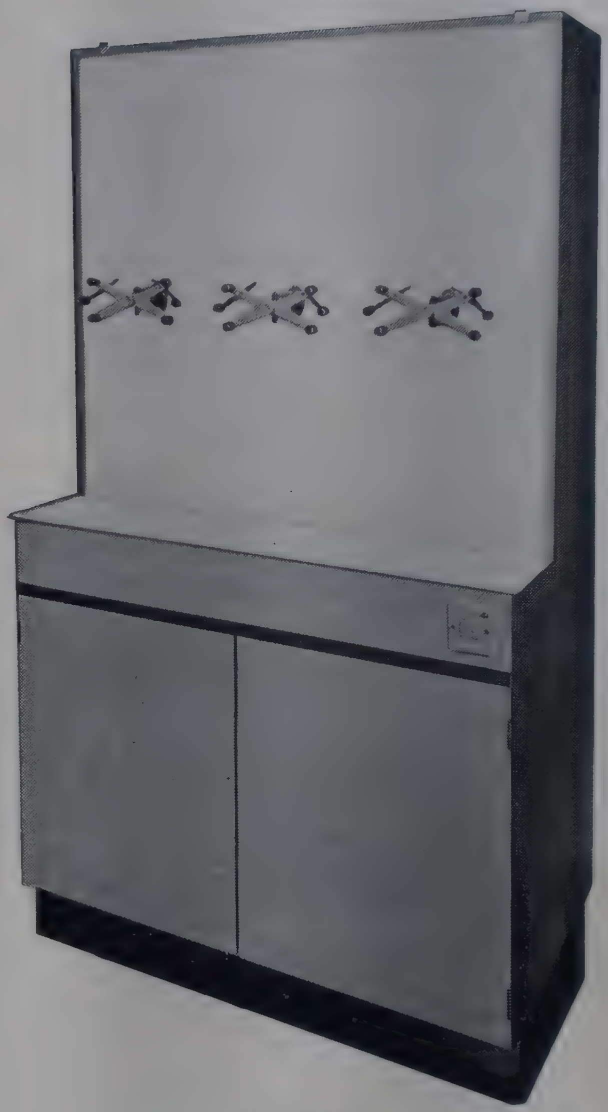
FX-520

VIEWING BACK UNIT, non-illuminated. For wall or bench mounting, 1000 mm wide × 250 mm deep × 1000 mm high, with white plastics back and glass roof cover. Timber frame of mahogany, externally polished to light shade. Fitted with three double spring clamps. Each **£66·00** *fxN*

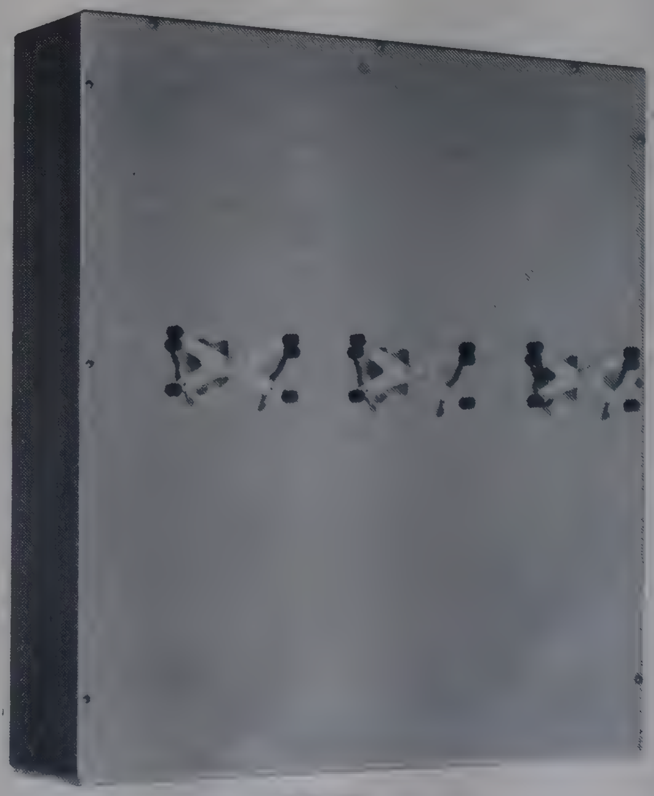
FX-521

VIEWING BACK UNIT, illuminated. For wall or bench mounting, 1000 mm wide × 250 mm deep × 1000 mm high, with translucent plastics back illuminated by fluorescent tubes controlled by switch mounted on left hand frame. Fitted with three double spring clamps. Roof cover of glass. Timber frame of mahogany, externally polished to light shade ... ... Each **£96·00** *fxN*

FX-520 and FX-521 can be supplied with finish to match oak range FX 101.



FX-511



FX-521

REFRIGERATORS

FX-530

RJ-810

Suitable for operation below bench tops provided that adequate provision for ventilation is made.

FX-530

REFRIGERATOR, *Electrolux*, 490 mm wide × 460 mm deep × 570 mm high. Suitable for use below bench tops. Internal volume 49 litres. Supplied with two shelves and ice tray. For 220/240V 50 Hz single phase supplies.

Each **£37·07** *fxN*

RJ-810

REFRIGERATOR, *Lec*, 500 mm wide × 510 mm deep × 830 mm high. Suitable for use below bench tops. Internal volume 115 litres. With manual defrost, automatic interior lighting, two shelves and two ice trays. For 220/240V 50 Hz single phase supplies. For price see entry in List. No. sequence.

When ordering FX-530 or RJ-810 please state:
- **(i) voltage and frequency of supply,**
- **(ii) whether right or left-hand hinged door required.**

Other types of refrigerators, including free standing and low temperature models—see RJ-810 et seq. in List No. sequence.

BALANCE TABLE

BD-200

BALANCE TABLE, floor mounting, to provide a working surface which is free from most vibrations inherent in buildings. Ideal for mounting analytical balances, galvanometers, optical levers and other vibration sensitive instruments. The table comprises a set of stone slabs and a set of sundries. The top member and two side members (which are drilled to accept the bracing bar) are of 8 cm thick grey/green mottled terrazzo stone. The sundries comprise the bracing bar, washers and flanges, and a set of rubber shock-absorbing pads. Supplied with instructions for assembly.

Overall height	76 cm
Working surface	90 × 76 cm
Net weight approx.	300 kg

For price see entry in List No. sequence.

LABORATORY STOOLS AND CHAIRS

(All dimensions are nominal)

FX-535

CHAIR, strong taper tube frame. Suitable for microscope and balance work. Seat height 460 mm. Upholstered seat and back, covered grey vinyl.

Each **£6·00** *mx*

FX-536

STOOLS, tubular steel, with 330 mm dia. seat upholstered and covered green 'Vynide'. Grey stove enamelled finish.

Height	600	680 mm	
Each	**£5·50**	**5·50**	*mx*

FX-537

STOOLS, beech frame with hardwood seat, polished to match light oak.

Height	600	680 mm	
Each	**£2·80**	**3·10**	*mx*

FX-538

STOOLS, beech frame with padded seat covered with green 'Vynide'. Frame polished to match light oak.

Height	600	680 mm	
Each	**£4·20**	**4·35**	*mx*

FX-539

CHAIRS, tubular steel, enamelled light grey, with grey polypropylene seat and back.

Height	530	580	660	740 mm	
Each	**£4·50**	**4·60**	**4·70**	**4·80**	*mx*

FX-540

CHAIRS, aluminium base and black stem with grey polypropylene seat and back. Size 620 mm has foot-ring. All chairs have 110 mm screw adjustment.

Height (min)	400	500	620 mm	
Each	**£7·90**	**12·00**	**12·60**	*mx*

FX-535

FX-536

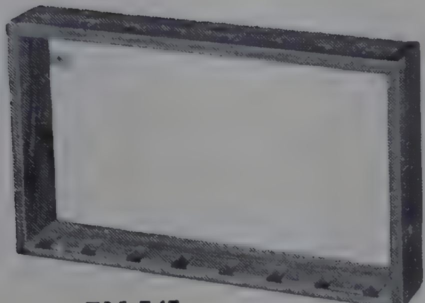
FX-537

FX-538

FX-539

FX-540

STORAGE RACKS



FX-545

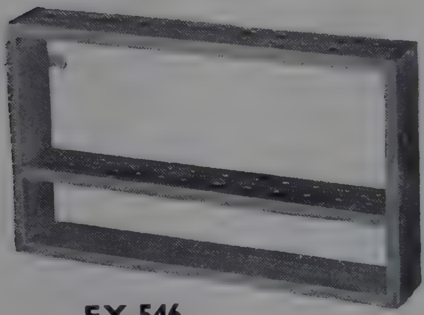
FX-545

RACK, burette, 460 mm × 76 mm × 270 mm high. Teak. Holds 8 × 50 cm^3 burettes. Fixed to wall by two mirror plates ... ... Each **£4·40** *cx*

FX-547

FX-547

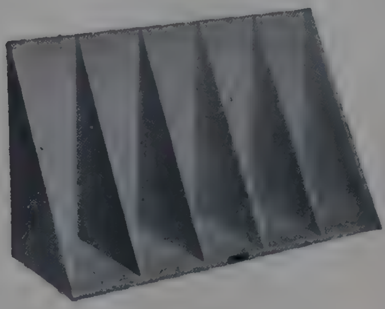
RACK, combined burette and pipette, 910 mm × 76 mm × 270 mm high. Teak. Holds 8 × 50 cm^3 burettes, 14 × 10cm^3 and 12 × 25 cm^3 pipettes. Fixed to wall by two mirror plates ... ... Each **£6·90** *cx*



FX-546

FX-546

RACK, pipette, 460 mm × 76 mm × 270 mm high. Teak. Holds 14 × 10cm^3 and 12 × 25 cm^3 pipettes. Fixed to wall by two mirror plates ... ... Each **£4·40** *cx*

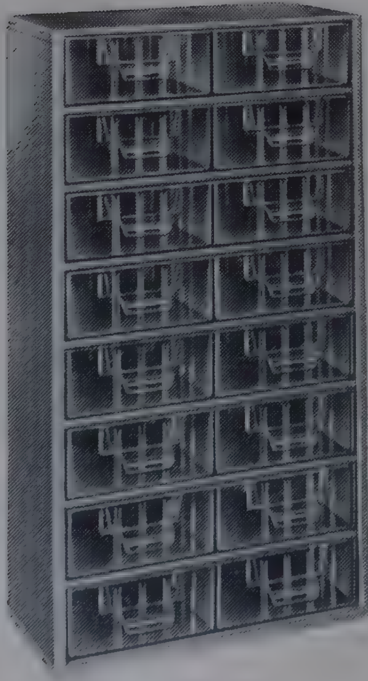


FX-548

FX-548

STAND, text book, 500 mm wide × 180 mm deep × 300 mm high. Oak, light polished ... Each **£4·60** *cx*

STORAGE CABINETS



FX-552

Robust enamelled steel cabinets with strong transparent plastics drawers for visible storage of small articles. Drawers have label holders and stop, to prevent accidental over pulling. Overall dimension of all cabinets 150 × 310 × 560 mm high.

List No.	No. of drawers	Size of drawers, mm H W D	Each	
			£	
***FX-550**	48	35 × 62 × 135	**6·25**	*mx*
***FX-552**	16	57 × 135 × 135	**6·25**	*mx*
***FX-554**	8	57 × 270 × 135	**6·25**	*mx*
***FX-556**	30 { 24	35 × 62 × 135	**6·25**	*mx*
	4	57 × 135 × 135		
	2	57 × 270 × 135		

GENERAL PURPOSE TROLLEYS

FX-565

TROLLEY, 910 mm length × 530 mm width × 860 mm height. Oak, light polished, having two shelves and fitted with rubber tyred castors ... ... Each **£19·40** *mx*

ACCESSORY

FX-566 **Tray,** oak, light polished, 810 mm length × 450 mm width × 75 mm height ... ... Each **£7·25** *mx*

FX-565

FX-568

TROLLEY, 800 mm length × 430 mm width × 790 mm height, constructed of rectangular steel tube. Suitable for the varied requirements of a laboratory. Finished white epoxy stoved enamel and having two removable trays and fitted with 10 cm dia. rubber castors.

Each **£21·50** *mx*

REPLACEMENT PART

FX-569 **Tray,** white epoxy stoved enamel, 610 mm length × 370 mm width with 25 mm lip and two carrying handles. Each **£3·00** *mx*

FX-568

All-metal vacuum trolley fitted with vapour traps and Vacustat—see VB-480 in List No. sequence.

VACUUM PUMP TROLLEY

A sturdy, purpose built trolley on which may be mounted one of a range of vacuum pumps and other associated equipment to provide a source of vacuum which is both convenient and mobile.

FX-575

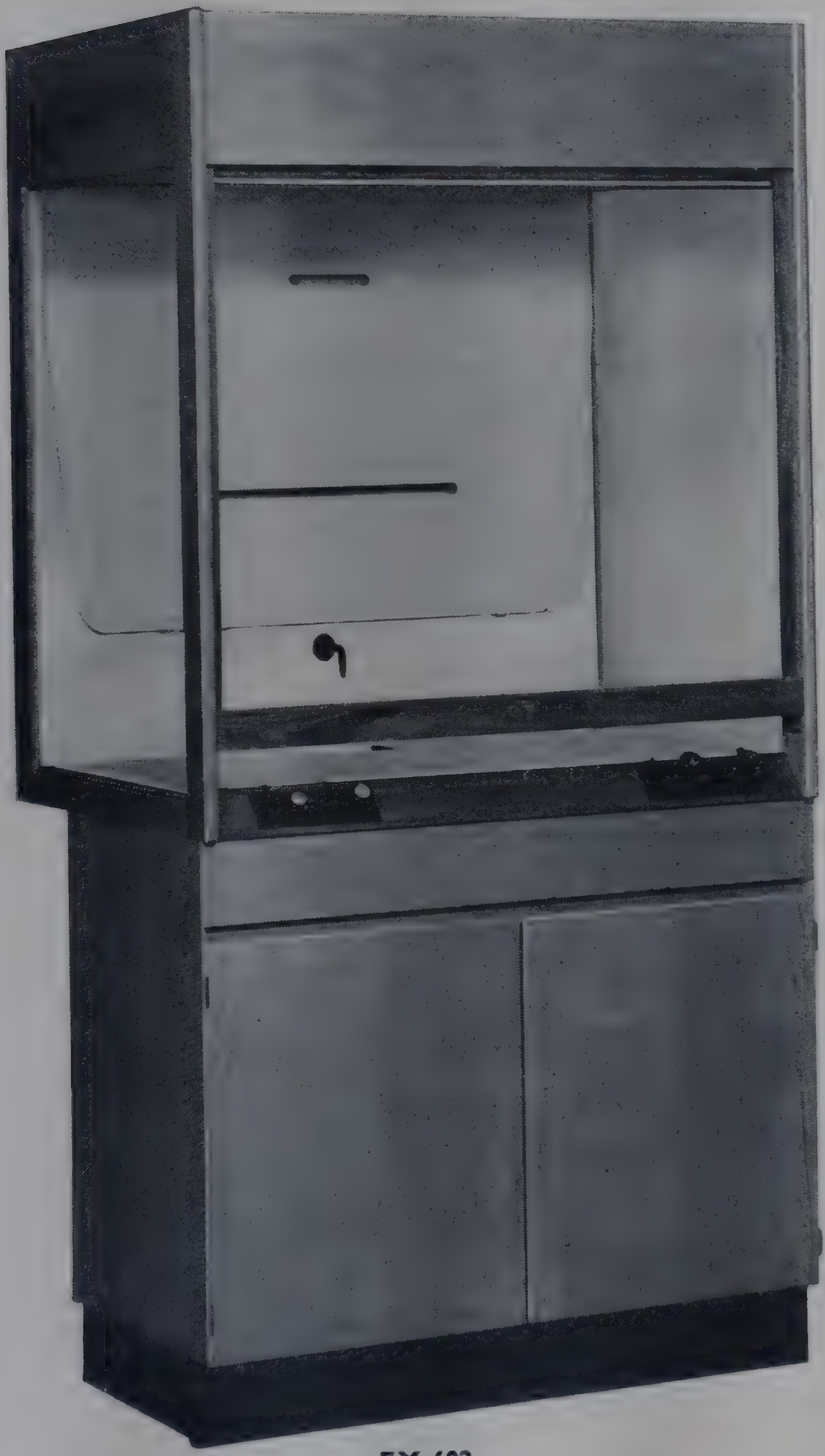
VACUUM PUMP TROLLEY. A sturdy trolley in natural beechwood, purpose built to provide a convenient and mobile laboratory vacuum source. The lower platform, dimensions 59 × 44 cm, is sufficiently large and robust to accept a wide range of vacuum pumps. The selected pump should be fitted with anti-vibration mountings when installed. The top shelf, dimensions 73 × 53 cm, has an inclined fascia panel at one end on which are mounted two diaphragm valves and a 5 cm dia. dial vacuum gauge scaled 0 to 760 mm Hg. These three components are fitted to a metal manifold to provide twin, parallel vacuum outlets. The corrugated nozzle on the manifold accepts 9–10 mm bore flexible tubing for connection to the vacuum pump. A grommet and hooks are fitted to the panel at the other end of the trolley so that the mains cable can be neatly and tidily stowed when the apparatus is not in use. This panel and the top shelf itself provide adequate space for the user to mount or stand any other equipment such as alternative gauges, vapour traps and so on, which may be needed for particular applications. The whole trolley runs on four rubber tyred castors, two of which have foot operated brakes which can be applied when the trolley is in position. **Supplied without vacuum pump, anti-vibration mountings or vapour traps** ... ... Each **£68·00** *bx*

- **Includes manifold, diaphragm valves and vacuum gauge**
- **Fitted with stowage hooks and grommet for mains cable**
- **Runs on easy-glide castors fitted with brakes**

FX-575

Gallenkamp STANDARD FUME CUPBOARDS

- Multiple assemblies can be made up with any number of units
- Duct opening at top to suit extraction requirements
- Back and roof lined with protective coated asbestolite
- Narrow stiles give excellent view and access
- Sash and sides glazed for all-round visibility
- Inclined fascia improves air flow and mounts service taps and forms front lip to retain spillage
- Standard under-bench unit
- Optional baffle controls air flow distribution
- Black asbestolite working top



FX-602

Dimensions

Width 1000 mm. Depth 762 mm. Height 2108 mm.
Height to work top 939 mm.
Height overall with sash fully raised 2740 mm approx.

STANDARD EXTERNAL FINISH

Oak, light polished to match FX 101 range bench units. On request we can supply mahogany framed fume cupboards for use with FX 102 and FX 103 series benches.

The carcase is timber framed, the sash frame and inclined fascia are of teak. Only a very small amount of these timbers is exposed inside the cupboard, thus practically eliminating fire and corrosion hazards.

COUNTERPOISED SASH

Hangs on terylene lines.

STANDARD GLAZING

For sash and ends, 4 mm sheet. The back and roof are lined with asbestolite, coated with polyurethane.

Alternative glazings and linings are available to meet specific requirements. Details and prices on application.

SERVICES

Front controlled services may be mounted on the inclined fascia with either integral nozzles, or remote controlled nozzles mounted at the back of the cupboard. Sinks may be fitted in the base, and electrical switches fixed to the top panel of the underbench unit.

OPEN SASH WORKING

When a baffle is fitted, the sash can be kept raised for many applications. If provided with protective glazing the sash can be regarded as a safety screen.

LIGHTING

Top lighting may be achieved by means of a fluorescent strip light fitted over a glazed panel let into the roof.

OPTIONAL EXTRA

Top panels may be extended to ceiling height to enclose ductwork.

Gallenkamp STANDARD FUME CUPBOARDS

REGD TRADE MARK

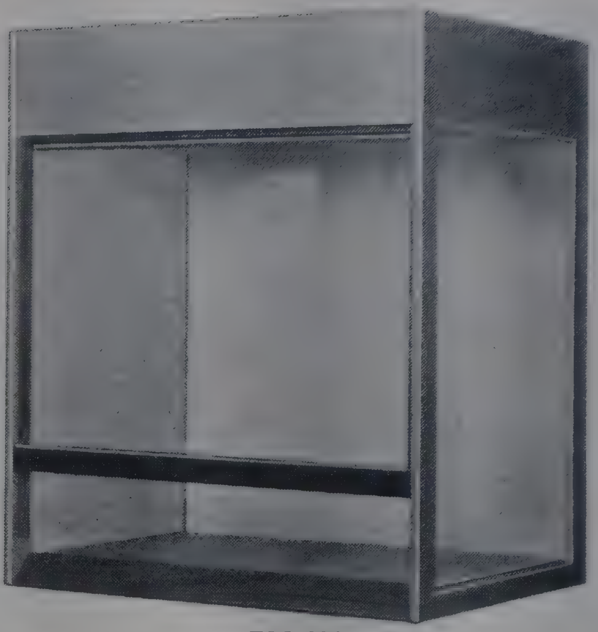
FX-600

FUME CUPBOARD, standard, 1000 mm wide × 762 mm deep × 1219 mm high, for mounting on existing bench top or support. Glazed counter-poised sash and ends with protected asbestolite back and roof. Work top of black asbestolite. No service fittings are included.

Each **£108·50** *fxN*

ACCESSORY

FX-601 **Baffle, asbestolite,** for fitting to standard fume cupboard FX-600. Coated for protection against corrosion. Readily dismantled for cleaning. Gives excellent control of air flow ... ... Each **£24·00** *fxN*



FX-600

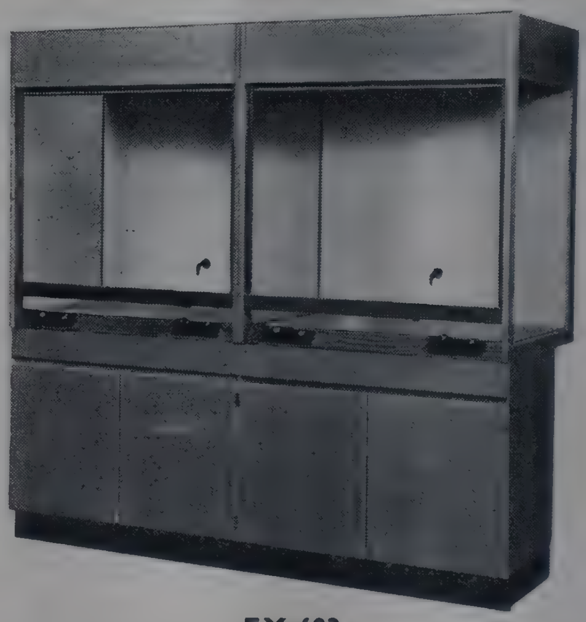
FX-602

FUME CUPBOARD, standard, 1000 mm wide × 762 mm deep × 2108 mm high. Comprises fume cupboard FX-600 with two glazed ends and glazed sash. Fitted with baffle FX-601. Working top of black asbestolite with hole cut for sink. Mounted on cupboard unit FX-161.

Services

1 panel mounting gas cock with integral nozzle FY-771, 1 water tap fron control FY-779, 1 water bend FY-791, 1 panel mounting compressed air tap with integral nozzle FY-773, 1 panel mounting vacuum tap with integral nozzle FY-772, 1 sink FY-840, 205 × 150 × 150 mm, 1 waste outlet, black polythene FY-857, 1 pair straps FY-841.

Each **£205·00** *fxN*



FX-603

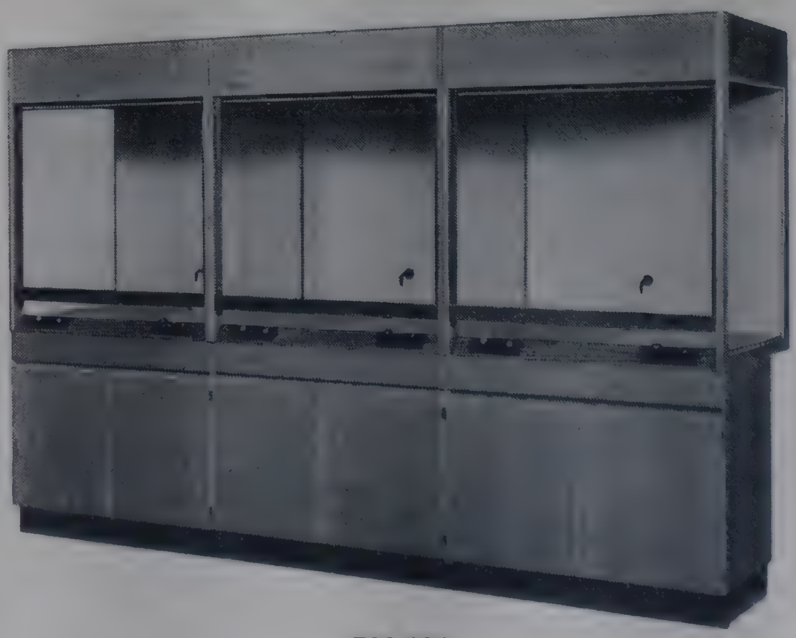
FX-603

FUME CUPBOARD, standard, 2000 mm wide × 762 mm deep × 2108 mm high. Comprises 2 fume cupboards FX-600 with 2 glazed ends and glazed division between, mounted on 2 cupboard units FX-161. Two end service panels as FX-331.

Services

2 panel mounting gas cocks with integral nozzles FY-771, 2 water taps front control FY-779, 2 water bends FY-791, 2 sinks FW-840, 205 × 150 × 150 mm, 2 waste outlets, black polythene FY-857, 2 pairs straps FY-841, 2 compressed air taps FY-773, 2 vacuum taps FY-772.

Each **£357·00** *fxN*



FX-604

FX-604

FUME CUPBOARD, standard, 3000 mm wide × 762 mm deep × 2108 mm high. Comprises 3 fume cupboards FX-600 having 2 glazed ends and 2 glazed centre divisions. Mounted on 3 cupboard units FX-161. Two end service panels as FX-331.

Services

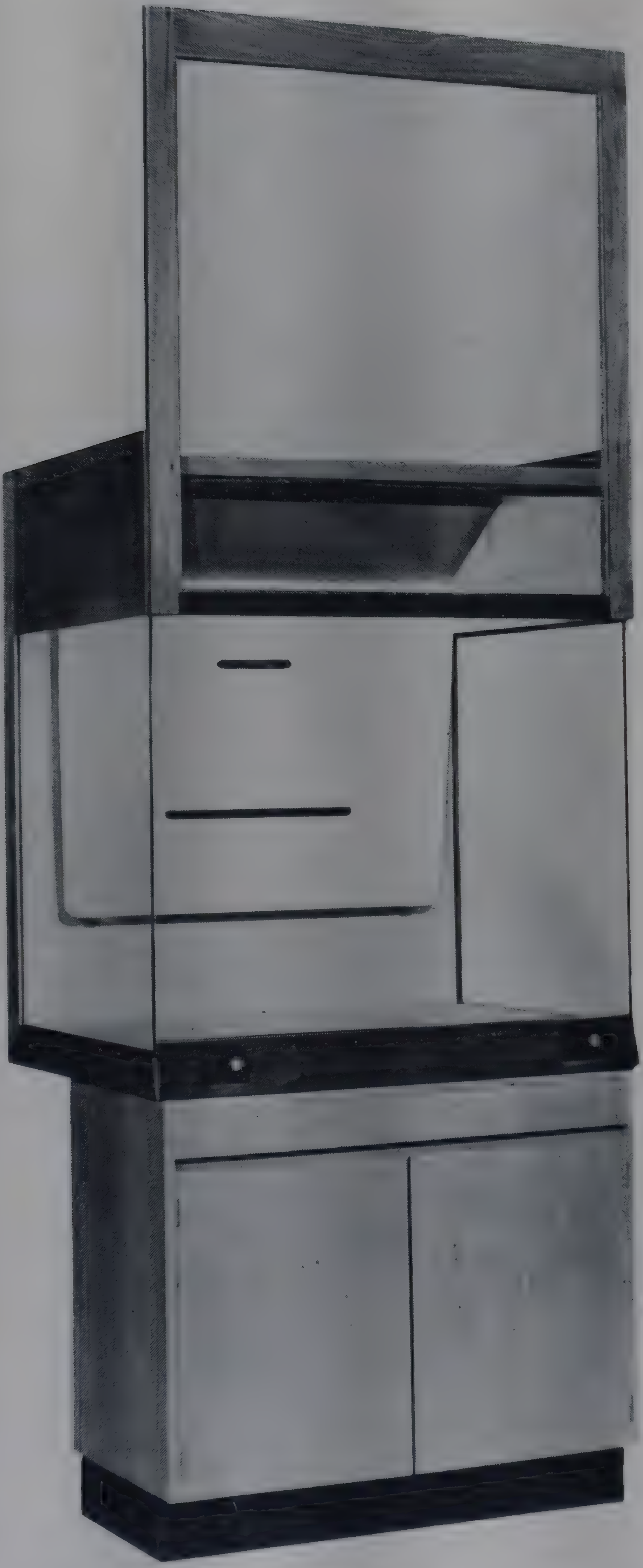
3 panel mounting gas cocks with integral nozzles FY-771, 3 water taps front control FY-779, 3 water bends FY-791, 3 sinks FY-840, 205 × 150 × 150 mm, 3 waste outlets, black polythene FY-857, 3 pairs straps FY-841, 3 compressed air taps FY-773, 3 vacuum taps FY-772 ... Each **£556·00** *fxN*

Any of the above fume cupboards may be mounted on a table underframe. Prices on application.

Gallenkamp 'OPENFLOW I' FUME CUPBOARDS

For open sash working.

- Positive air flow ensures minimum eddies into room
- Technoplate * toughened glass sashes are used as safety screens—not to retain fumes inside cupboard
- Preset baffles control air flow distribution
- No front stiles to impede access
- Removable ends (and divisions in multiple units) facilitate cleaning and decontamination
- Full width open bench top in range of cupboards when divisions are removed
- Corrosion resistant interior of armoured glass and protected asbestolite. Alternative materials available



Dimensions:

Width 1000 mm. Depth 889 mm. Height 2184 mm.
Height to work top 978 mm.
Height overall with sash fully raised 3050 mm approx.

STANDARD EXTERNAL FINISH

Oak, light polished, to match FX 101 series of bench units.

Cupboards can be supplied mahogany framed for use with FX 102 mahogany and FX 103 plastics faced bench units. Prices on application.

CONSTRUCTION

The carcase is cantilever framed in oak, the sash frame and inclined fascia being of teak. Only a very small amount of these timbers is exposed inside the cupboard, thus practically eliminating fire and corrosion hazards. The counterpoised sash is hung on terylene lines.

SERVICES

Front controlled services may be mounted on the inclined fascia with either integral nozzles, or remote controlled nozzles mounted at the back of the cupboard. Sinks may be fitted in the base, and electrical switches fixed to the top panel of the carcase unit.

LIGHTING

Top lighting may be achieved by means of a fluorescent strip light fitted over a glazed panel let into the roof. Price on application.

FIXING

These fume cupboards are self-supporting, but light wall fixing at the top is essential. Wherever possible we recommend that our installation engineers erect cupboards and extraction/induction plant.

Multiple units need overhead guide runners to facilitate even operation of the sashes.

* Refer to page 298.

Gallenkamp 'OPENFLOW I' FUME CUPBOARDS

For open sash working.

FX-605

FUME CUPBOARD, *Openflow I*, **controlled draught,** 1000 mm wide × 889 mm deep × 1295 mm high for mounting on existing bench top or table underframe. All glazing in toughened glass with side panels removable. Working top of black asbestolite with back and roof of protected asbestolite. The cupboard is fitted with baffle FX-601.

Services

2 panel mounting gas taps with integral nozzles FY-771.
Each **£213·00** *fxN*

FX-605

FX-606

FUME CUPBOARD, *Openflow I*, **controlled draught,** 1000 mm wide × 889 mm deep × 2184 mm high. Comprises fume cupboard FX-605 set on cupboard unit as FX-161. Working top of black asbestolite. Two end service panels as FX-331. The cupboard is fitted with baffle FX-601.

Services

2 panel mounting gas taps with integral nozzles FY-771.
Each **£263·00** *fxN*

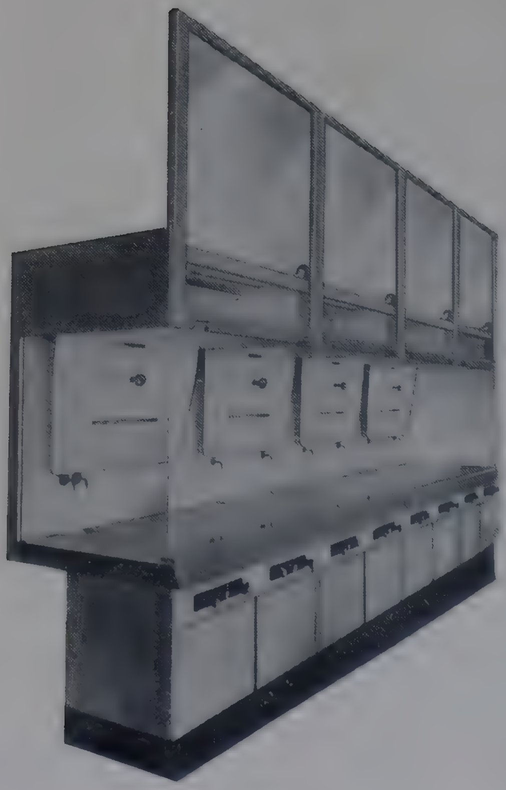
FX-606

FX-607

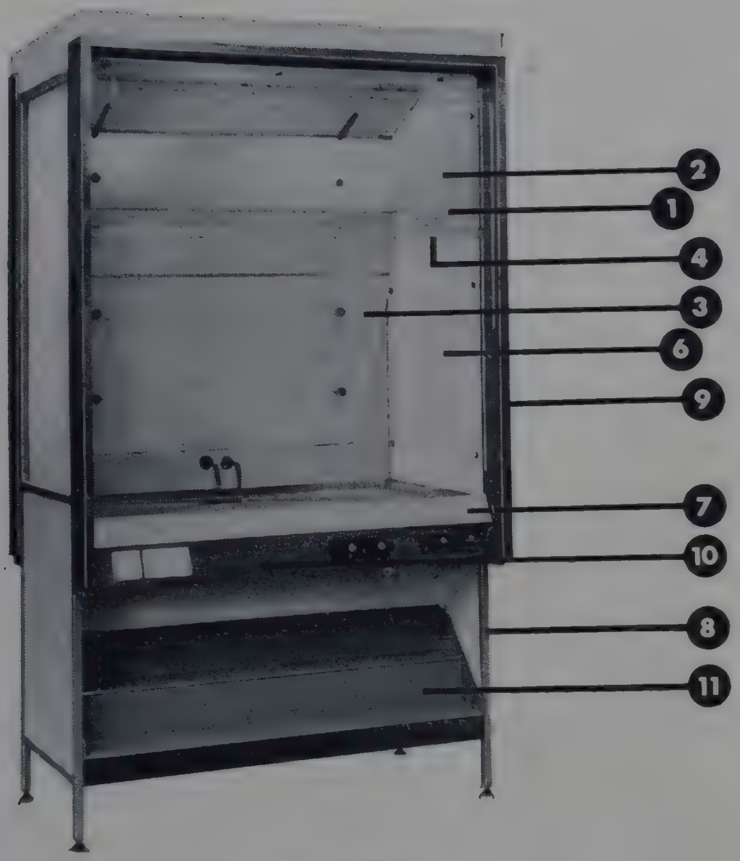
FUME CUPBOARD, *Openflow I*, 4000 mm wide × 889 mm deep × 2184 mm high. Comprises four fume cupboards FX-605, set on four cupboard units as FX-161 and two end service panels as FX-331. Each section fitted with baffle FX-601. Working top of black asbestolite with four notches for sinks.

Services

4 sinks 205 × 150 × 150 mm FY-840, 4 plugs FY-857, 8 water taps, front control FY-779 with bends FY-791, 8 panel mounting gas taps with integral nozzles FY-771, 4 panel mounting compressed air taps FY-773, 4 pairs sink straps FY-841 ... ... Each **£1207·00** *fxN*


FX-607

Gallenkamp 'OPENFLOW II' FUME CUPBOARDS



FX-608

HIGH EFFICIENCY AIR-FLOW

The sash is used as a safety screen—not to retain fumes within the cupboard. Positive air-flow ensures that no eddies pass into the room and efficient scavenging is achieved with the minimum consumption of air from the laboratory.

- **Duct through double element sash** (1) and **main by-pass duct** (2) provide progressive two stage by-pass which automatically controls air velocity beneath the sash as it is raised or lowered.
- **Three element fixed baffle** (3) stabilises extracted air-flow.
- **Balanced draught duct incorporating baffle and filter** (5) (when fitted) further conserves conditioned air in laboratory by replacing calculated proportion of extraction with fresh air taken from outside building.

CORROSION RESISTANT MATERIALS

Technoplate * toughened glass body. Ends (6) sash (4) extraction baffles (3). Stainless steel (FMB grade) back and outlet duct connector.

Stainless steel, FMB grade, tanked work top (7) with waste outlet.

Condensation, if occurring, forms mainly on toughened glass and stainless steel surfaces, to fall directly inside lips of tanked work top.

GENERAL FEATURES

Sectional construction facilitates handling and reduces freight charges.

End frames (8) of square section steel tube, with floor-level adjusters.

Front frame (9) of teak, finished with polyurethane. Front rail (10) mounts front controlled services. Rear frame also of teak.

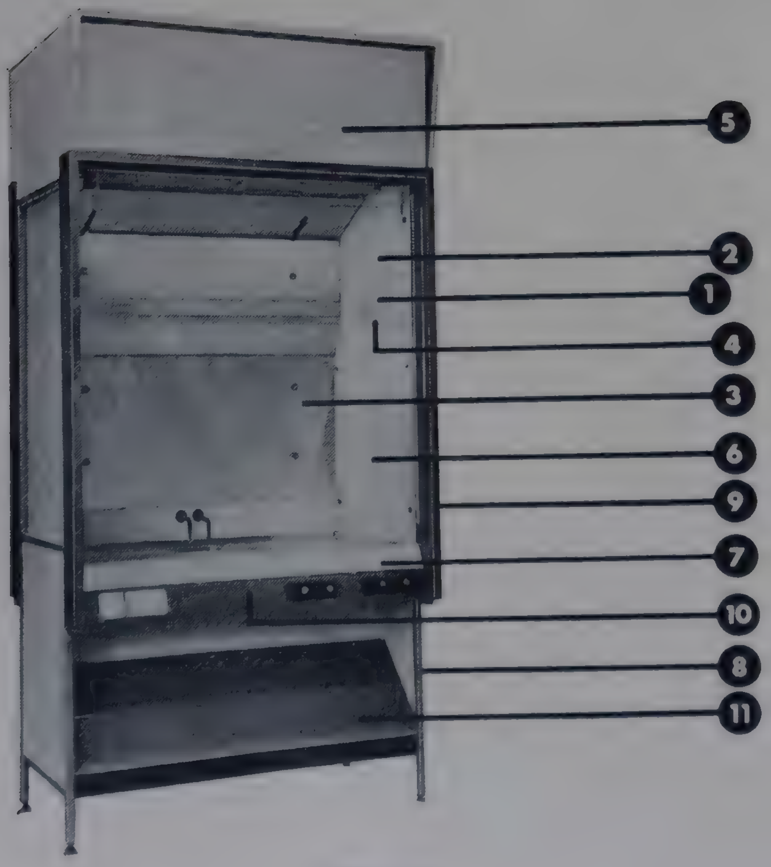
Rimless double element sash (4) with interlocking weights counterpoised on stainless steel lines.

Top lighting by means of fluorescent tube mounted above the inner roof lining.

Stepped bottle shelves (11) of PVC. Can be vented by exhaust system as optional extra.

Cleaning and decontamination facilitated by smooth finish, rimless panels and sashes.

***Technoplate** toughened glass is capable of withstanding both considerable impact and distributed heat. It is normally unaffected by the action of all alkalis and organic substances and all acids, with the exception of hydrofluoric acid. To minimise the effect of the latter, the Technoplate used in the construction of the cupboard is obscured, by etching of the extraction baffle elements, and end panels. The result is that such etching as may occur is not readily discernible.



FX-609

Gallenkamp 'OPENFLOW II' FUME CUPBOARDS

STABILISED EXTRACTION SYSTEM

When the sash is fully raised to provide an access height of 838 mm the air drawn into the cupboard passes across the open face beneath the sash. Velocities are acceptably even. As the sash is lowered, the stage one by-pass between the two sash elements conveys air to the top of the cupboard to control velocity over the reduced face aperture. As the sash is brought down still further, the stage two main by-pass is operated, again to limit face velocity beneath the sash. This control is maintained until the sash is fully lowered. According to the task to be performed, nominal face velocities (with sash fully raised) can vary from 10 to 30 m/min dependent on the fan and duct system employed. Within this range, the exceptionally gentle nature of the extraction will interfere in no way with the work being done, and efficient scavenging is assured.

FX-608

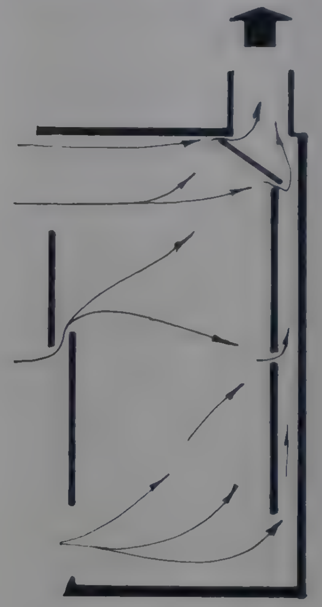
FUME CUPBOARD, *Openflow II,* **with by-pass, for stabilised extraction.** Overall 1500 mm wide × 914 mm deep × 2438 mm high. Body ends and extract baffle of obscured Technoplate toughened glass. Back and duct connector (nominal 412 mm × 159 mm), of FMB grade stainless steel. Double element sash of transparent Technoplate toughened glass, counterpoised with interlocking weights on stainless steel lines. Picture frame of teak. Rear frame of teak. Outer roof of laminated timber with white polyurethane finish. Tanked work top made from FMB grade stainless steel with waste outlet. End frames of square section steel, with floor-level adjusters and lower panels finished both sides in white melamine plastics. Stepped Winchester quart bottle rack of PVC fitted below cupboard with back finished in white melamine plastics. Front controlled services mounted on inclined fascia panel include one switch wired to interior lighting, two 13A electric sockets, two cold water fittings FY-779, with two vertical mounting swan-necks FY-792, two gas cocks FY-771, one vacuum valve FY-772 and one compressed air valve FY-773.

Complete unit, dismantled into sections, excluding all plumbing and electrical connections and excluding exhaust fan and trunking ... ... Each **£602·00** *fxN*

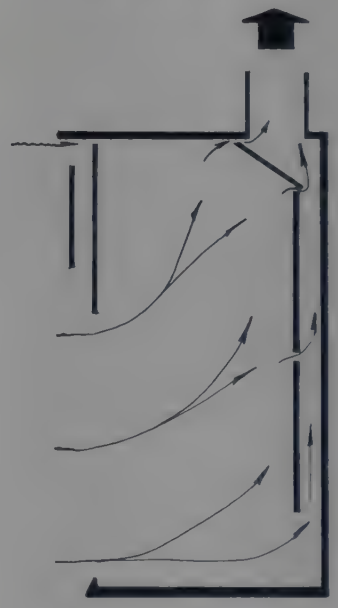
ASSEMBLY AND INSTALLATION. Assembly instructions can be provided with each fume cupboard, but it is recommended wherever possible our factory-trained personnel should be employed. Quotations will be provided on request for assembly, installation, plumbing and electrical connections.

FLOW DIAGRAMS

STABILISED EXTRACTION SYSTEM



SASH RAISED 230mm.



SASH FULLY RAISED

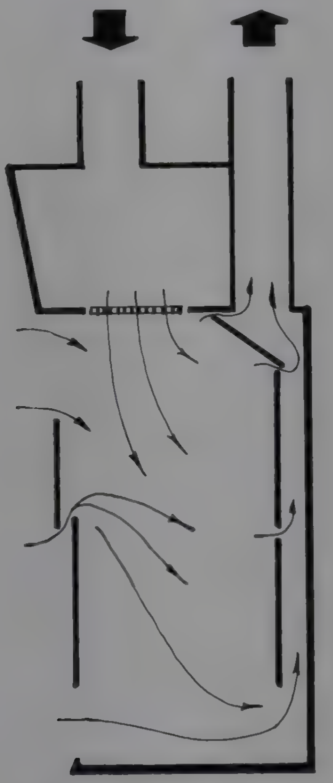
DIMENSIONS	FX-608
WIDTH, overall internal	1500 mm 1424 mm
DEPTH, overall internal	914 mm 610 mm
HEIGHT, overall inside fume cupboard	2438 mm 1422 mm at front 1321 mm at rear

For 'Openflow II' Cupboard with down-draught extraction see page 301.

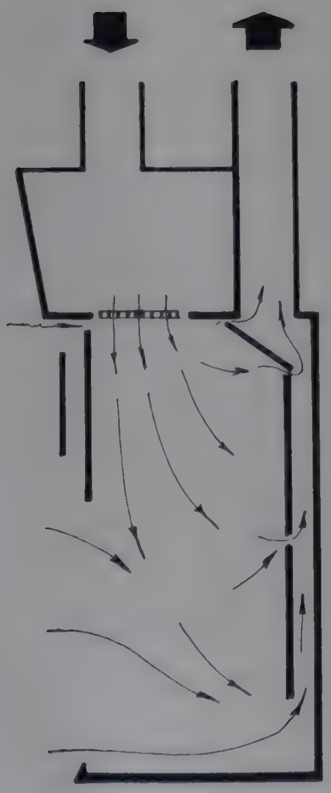
Gallenkamp 'OPENFLOW II' FUME CUPBOARDS

FLOW DIAGRAMS

BALANCED DRAUGHT SYSTEM



SASH RAISED 230mm.



SASH FULLY RAISED

BALANCED DRAUGHT SYSTEM

It is wasteful if a fume cupboard removes excessive quantities of expensively conditioned air from the laboratory. This applies particularly in a small room accommodating several cupboards, and/or where a cupboard is provided with extraction involving a high face velocity, say 25 m/min, to remove highly toxic or corrosive fumes. The FX-609 balanced draught system overcomes the problem by replacing a calculated proportion of the extraction with untreated air drawn from outside the building. This balancing air is passed from the roof of the cupboard, through a larger filtered duct, to discharge at low velocity vertically behind the sash. It becomes entrained with air, induced from the room across the open face beneath the sash, to form a flow pattern resembling that of the FX-608 stabilised extraction system. The result is a significant reduction of velocity across the open face. Usually approximately 55% replacement with untreated air is achieved but the proportion can be varied by selecting appropriate fans to suit specific requirements. The system, by reason of its gentle action, offers no discomfort to the operator nor interferes with work in hand. This, coupled with extremely efficient scavenging, is a condition rarely found in balanced and auxiliary air fume cupboards.

FX-609

FUME CUPBOARD, *Openflow II,* **with by-pass, for balanced draught and stabilised extraction.** Overall 1500 mm wide × 914 mm deep and 991 mm deep at ceiling × 2894 mm high. As FX-608, but with balanced draught duct mounted on roof. Duct fabricated from laminated timber, finished externally in white polyurethane, with interior baffle and filter. An inlet hole of 250 mm diameter is provided in the roof of the duct to accommodate a flanged entry.

Complete unit, dismantled into sections, excluding all plumbing and electrical connections and excluding fans and trunking ... ... Each **£680·00** *fxN*

DIMENSIONS	FX-609
WIDTH, overall internal	1500 mm 1424 mm
DEPTH, overall internal	991 mm 610 mm
HEIGHT, overall inside fume cupboard	2894 mm at front 1321 mm at rear

ASSEMBLY AND INSTALLATION. Assembly instructions can be provided with each fume cupboard, but it is recommended wherever possible our factory-trained personnel should be employed. Quotations will be provided on request for assembly, installation, plumbing and electrical connections.

Gallenkamp 'OPENFLOW II' FUME CUPBOARD

With down-draught extraction, water cooled baffle and scrubbing chamber

STABILISED EXTRACTION SYSTEM

When the sash is fully raised to provide an access height of 838 mm the air drawn into the cupboard passes across the open face beneath the sash. Velocities are acceptably even. As the sash is lowered, the stage one by-pass between the two sash elements conveys air to the top of the cupboard to control velocity over the reduced face aperture. As the sash is brought down still further, the stage two main by-pass is operated, again to limit face velocity beneath the sash. This control is maintained until the sash is fully lowered. According to the task to be performed, nominal face velocities (with sash fully raised) can vary from 10 to 30 m/min dependent on the fan and duct system employed. Within this range, the exceptionally gentle nature of the extraction will interfere in no way with the work being done, and efficient scavenging is assured.

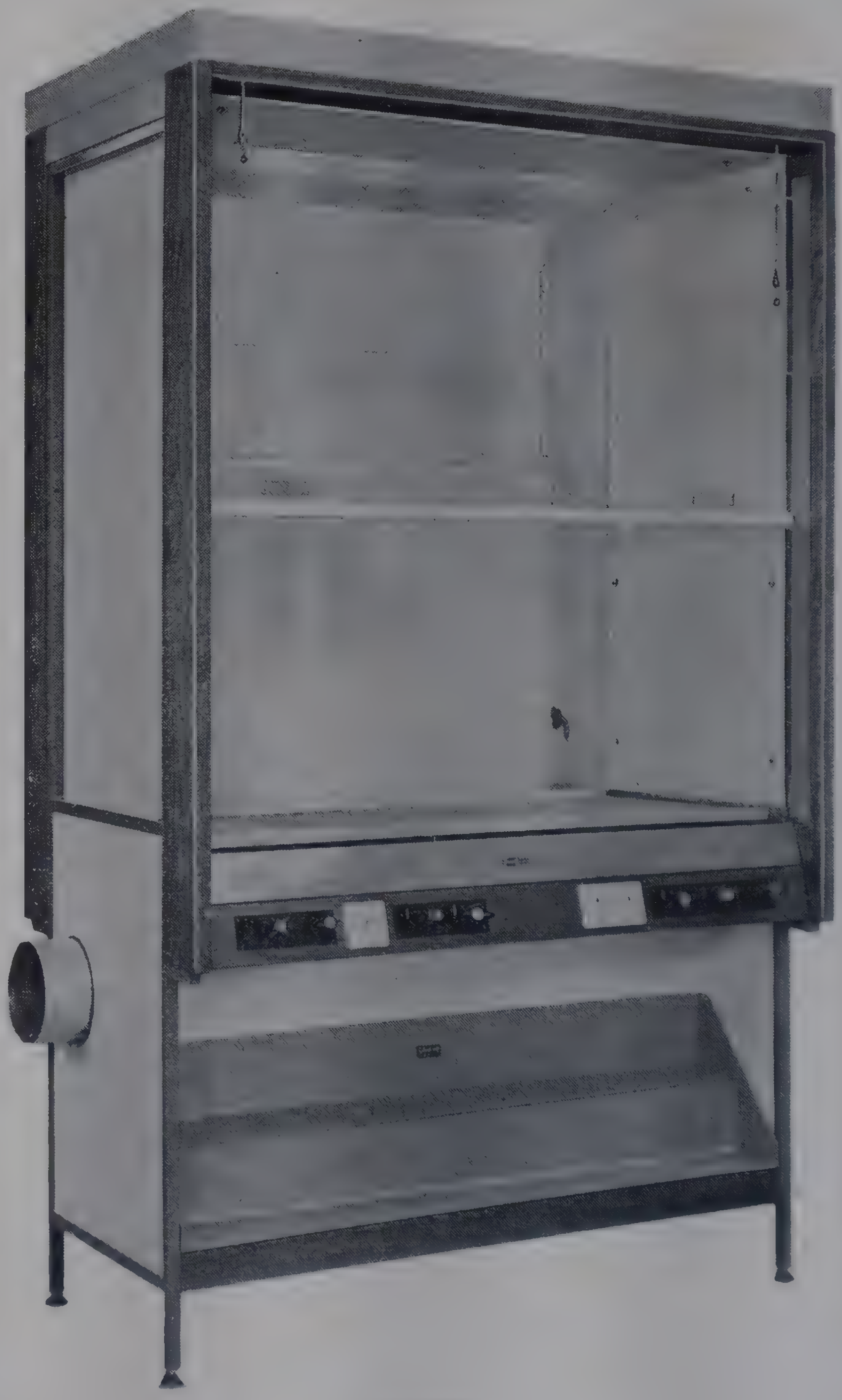
Down-draught extraction. In a down-draught extraction system fumes are drawn into a baffle which is fitted with a water spray to achieve cooling and, in some cases, partial absorption. The combined flow of fumes, air and water then passes through a scrubbing chamber, in which a further cold water spray operates, and thence fumes are conveyed through a duct and fan to atmosphere. This system, combined with consideration of the materials used for the construction of the fume cupboard has caused many users to specify this equipment for the extraction of perchloric acid fumes.

FX-610

FUME CUPBOARD, *Openflow II*, with by-pass, stabilised down-draught pattern, with water cooled baffle and scrubbing chamber. Overall 1448 mm wide × 914 mm deep × 2438 mm high. Body ends and roof of obscured Technoplate toughened glass. Double element sash of transparent Technoplate toughened glass, counterpoised with interlocking weights on stainless steel lines. Back, double element baffle, tanked base and frame support for Technoplate work top made from FMB grade stainless steel. The tanked base has a combined flue and drain outlet. This outlet discharges directly into a scrubbing chamber, made from rigid PVC, which is fitted at the rear of the cupboard beneath the work top with a 203 mm internal diameter PVC flue outlet at the left hand side of the unit, as illustrated. The scrubbing chamber is provided also with an internal water spray and drain outlet. Front picture frame and rear frame of teak. Outer roof of laminated timber with white polyurethane finish. End frames of square section steel with floor level adjusters and lower panels finished both sides in white melamine plastics. Stepped Winchester quart bottle rack of PVC fitted below cupboard, in front of scrubbing chamber, with back of white melamine plastics. Front controlled services mounted on inclined fascia panel include one switch to operate the lighting, two 13A switch sockets, two cold water fittings FY-779 with two vertical mounting swan-necks FY-792, two gas cocks FY-771, one vacuum valve FY-772 and one compressed air valve FY-773. An additional cold water control FY-779 is fitted to control the water spray together with two valves to regulate the flow.

Complete unit, dismantled into sections, excluding all plumbing and electrical connections and excluding exhaust fan and trunking ... ... Each **£880·00** *fxN*

The exhaust flue outlet is specified and illustrated as being at the left hand side of the unit. Right hand or rear connections can be arranged if required.



FX-610

ASSEMBLY AND INSTALLATION. Assembly instructions are provided with each fume cupboard, but it is recommended wherever possible our factory-trained personnel should be employed. Quotations will be provided on request for assembly, installation, plumbing and electrical connections.

FUME EXHAUST FANS

Efficient fume extraction plant is one of the most important features in a chemical laboratory and *Gallenkamp* are specialists in the field of designing, manufacturing and erecting such equipment. A complete service is offered based on many years experience and specialist engineers are available to advise on the selection of plant and subsequently to prepare designs and estimates.

Our standard centrifugal and axial flow fans have been designed to satisfy the varied and exacting requirements of laboratory fume extraction. Casings are of polyester resin reinforced with glass fibres and such materials have proved particularly resistant to the corrosive fumes extracted from the majority of laboratory installations. Centrifugal fans operate satisfactory in temperatures up to 120°C. Axial flow fans which have air-stream rated motors and nylon impellers must not be used where the fume temperature exceeds 65°C.

For special applications where our standard polyester resin/glass fibre fans are not suitable we can supply fans made from rigid PVC or polypropylene. Details of such fans will be supplied on request.

Ducting is generally of either anti-acid treated asbestolite or rigid PVC but other materials such as polypropylene can be supplied for special applications.

Many plants are designed to meet the exacting conditions created by radioactive dust and toxic or explosive fumes. In these cases a high rate of extraction is usually required, and fans and ducting associated with balanced extraction systems can be incorporated in such schemes to reduce loss of conditioned air within the laboratory.

Plant design. We can advise on the selection of suitable equipment and prepare designs and estimates. Our design staff is at the disposal of customers contemplating new installations and, if necessary, a ventilation engineer will call to discuss details.

Projects however can be fully appreciated if the following information is provided:—

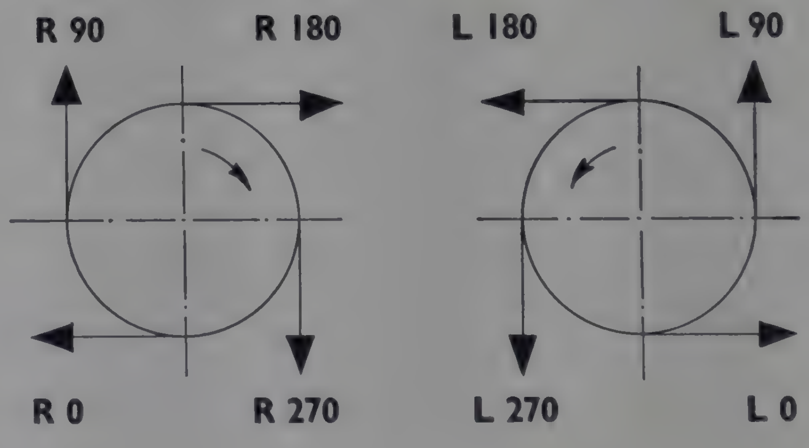
Plans and sectional drawings or dimensioned sketches, indicating the proposed position of the fume chamber, possible siting of the fan and an indication of the run of ducting.

Power supply. Please state voltage and characteristics of supply.

Hand of discharge. Please state prefix letter and figure required as shown on chart. (Applicable to centrifugal fans only.)

Nature of particularly corrosive fumes likely to be exhausted, with an indication of maximum temperature involved if likely to exceed 50°C.

Hands (directions) of discharge of centrifugal fans



The fans are viewed from the driving side and the angle of discharge is designated by the figures following the prefix, measured in degrees, and starting from the horizontal.

CENTRIFUGAL FANS

Centrifugal fans are designed for use in arduous extraction conditions and can be mounted for any angle of discharge.

Fan casings are moulded from polyester resin reinforced with glass fibres and constructed so that no bolts, nuts or screws project into the interior of the casing. Inlet plates are fitted with spigots for connection to ducting. Outlets are flanged and fitted with developments. Plastics condensate drain plugs are fitted at the lowest point of the casings.

Impellers are of the multi-vane type, cast in one piece from epoxy resin and fitted with rear boss for direct coupling to the motor.

Fans FX-800 and FX-801 are fitted with radial impellers.

Fans FX-804 and FX-805 are fitted with forward curved impellers.

Motors are totally enclosed, fan cooled with alternative models wound for single phase or three-phase 50 Hz a.c. supplies. Standard motors supplied are for use in locations where ambient conditions do not exceed 40°C and 80% relative humidity and at altitude less than 975 m.

Starters are of the push-button contactor type, fitted with no-volt and overload releases.

Buxton certified flameproof motors and special motors and starters for other ambient conditions and electricity supplies can be supplied for centrifugal fans. Details on application.

Centrifugal Fan
For performance graph see overleaf

TECHNICAL DATA
Discharge pipe diameters relate to asbestos ducting only.

List No. of fan	Fan size	Speed rev/min	Load kW	Air delivery. Free intake and discharge m³/h	Approx. weight kg	Fan inlet int. dia. mm	Discharge pipe int. dia. mm	Approx. overall dimensions mm
FX-800 and FX-801	1	1425	0·18	540	21	152	150	483 × 381 × 432
	2	1425	0·25	1100	27	203	200	533 × 508 × 483
	3	1425	0·55	2100	32	228	225	660 × 584 × 508
	4	1425	1·50	5300	55	305	300	660 × 635 × 559
FX-804 and FX-805	2	1425	0·55	1500	30	203	200	533 × 508 × 483
	3	1425	1·10	2600	41	228	225	660 × 584 × 508

Discharge outlets to suit PVC ducting can be manufactured on request.

AXIAL FLOW FANS

Axial flow fans provide an economical means of extraction from small fume cupboards. They may be inserted either in a short run of ducting or directly to the fume cupboard.

Fan casings are moulded from polyester resin and glass fibre. Exterior metal flanges to suit asbestos ducting are available and can be supplied for fitting to each end of the fan unit. Alternatively a PVC ring can be supplied for fixing the fan unit directly to the roof of the fume cupboard.

Fan blades are moulded from nylon 2.

Motors are of the capacitor start and run type, totally enclosed with condensers mounted on the outside of the fan chamber and suitable for single phase 50 Hz supplies. For use in locations where ambient conditions do not exceed 40°C and 80% relative humidity and at altitudes less than 975 m.

Metal parts are treated with epoxy resin enamel.

Ducting for use with axial flow fans is listed on page 305.

Axial Flow Fan
For performance graph see overleaf

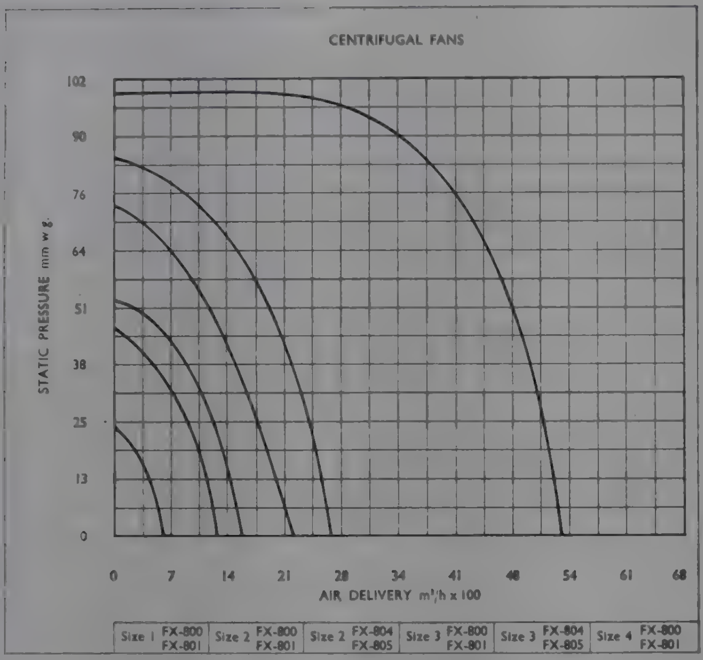
TECHNICAL DATA

List No. of fan	Fan size	Speed rev/min	Load kW	Air delivery. Free intake and discharge m³/h	Approx. weight kg	Fan inlet int. dia. mm	Discharge pipe int. dia. mm	Approx. overall dimensions mm
FX-815	1	2700	0·04	600	5·5	175	175	228 × 254 dia.
	2	2700	0·04	1500	7	225	225	228 × 305 dia.
	3	1425	0·04	750	7	225	225	228 × 305 dia.

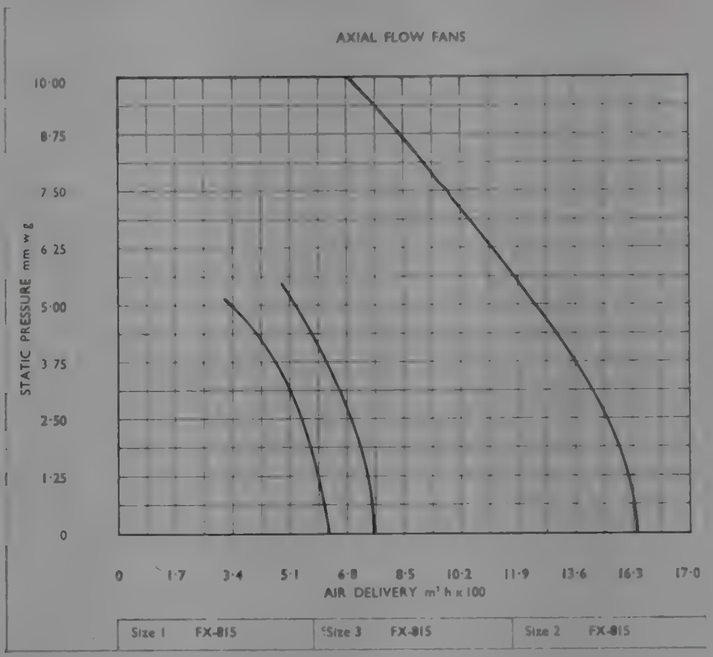
FUME EXHAUST FANS

For technical data see pages 303 and 304.

PERFORMANCE DATA FOR CENTRIFUGAL FANS



PERFORMANCE DATA FOR AXIAL FLOW FANS



CENTRIFUGAL FANS AND FITTINGS

		SIZE OF FAN				
		1	2	3	4	
FX-800 **FANS, centrifugal, fibreglass,** direct coupled to motor, for 200/220 or 230/240V 50 Hz single phase supplies. Fitted with **radial impeller** ...	Each	£108·00	126·00	172·00	240·00	*mxN*
FX-801 **FANS, centrifugal, fibreglass,** direct coupled to motor, for 380/440V 50 Hz three phase supplies. Fitted with **radial impeller**	Each	£108·00	126·00	167·00	214·00	*mxN*
FX-804 **FANS, centrifugal, fibreglass,** direct coupled to motor for 200/220 or 230/240V 50 Hz single phase supplies. **Fitted with forward curved impeller**	Each	£ —	153·00	206·00	—	*mxN*
FX-805 **FANS, centrifugal, fibreglass,** direct coupled to motor for 380/440V 50 Hz three phase supplies. **Fitted with forward curved impeller...**	Each	£ —	143.00	192·00	—	*mxN*
FX-808 **STARTERS,** push-button, with combined thermal and magnetic overload releases, for FX-800 and FX-804	Each	£ 8·85	8·85	8·85	12·00	*mxN*
FX-809 **STARTERS,** push-button, with combined thermal and magnetic overload releases, for FX-801 and FX-805	Each	£ 8·85	8·85	8·85	10·50	*mxN*
FX-810 **SHELVES,** asbestolite, with steel cantilevers for supporting fan and motor on wall	Each	£ 8·50	8·50	9·55	9·55	*mxN*

When ordering please state voltage and frequency of supply.

Prices for equipment wound for non-standard a.c. and d.c. supplies can be quoted on application.

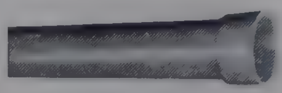
AXIAL FLOW FANS AND FITTINGS

		SIZE OF FAN			
		1	2	3	
FX-815 **FANS, axial flow, fibreglass,** with motor for 220/240V 50 Hz single phase supplies	Each	£55·00	77·00	80·00	*mxN*
FX-816 **STARTERS,** push-button, with thermal overload release, for FX-815...	Each	£ 3·50	3·50	3·50	*mx*
FX-817 **FLANGES,** matching, to connect axial flow fan to ducting	Pair	£ 6·50	7·50	7·50	*mx*
FX-818 **GASKETS,** jointing, for use with matching flanges	Pair	£ 1·30	1·45	1·45	*mx*
FX-819 **RINGS,** angle, PVC, to connect axial flow fan to fume cupboard ...	Each	£ 4·20	4·90	4·90	*mx*

ASBESTOLITE DUCTING

Made of asbestos material, specially treated to resist acid fumes.
Pipes are easily cut with a fine saw and secured to walls, etc., with ordinary fascia brackets.

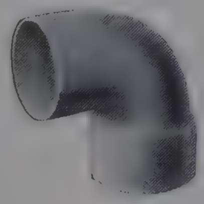
The ducting listed below is for use with axial flow fans FX-815.
Size 1 fans require 175 mm dia. ducting.
Sizes 2 and 3 fans require 225 mm dia. ducting.



FX-830

FX-830
PIPES, straight, asbestolite, with socket. In lengths of 1830 mm.

Int. dia.	175	225 mm	
Each	**£14·00**	**19·00**	*cx*



FX-832

FX-832
BENDS, 90°, asbestolite, with socket.

For pipe int. dia.	175	225 mm	
Each	**£6·25**	**9·60**	*cx*

FX-834

FX-834
COWLS, anti-pocket, asbestolite, with deflector cap and socket.

For pipe int. dia.	175	225 mm	
Each	**£17·60**	**22·00**	*cx*

FX-840
CEMENT, for jointing asbestolite piping and bench tops, fire-clay and stoneware troughs and pipes, etc. Supplied in a tin with a separate tin of solvent solution, and full directions for use.

Weight	2	8 kg	
Each	**£5·00**	**12·00**	*cx*

FUME EXTRACTION PLANT

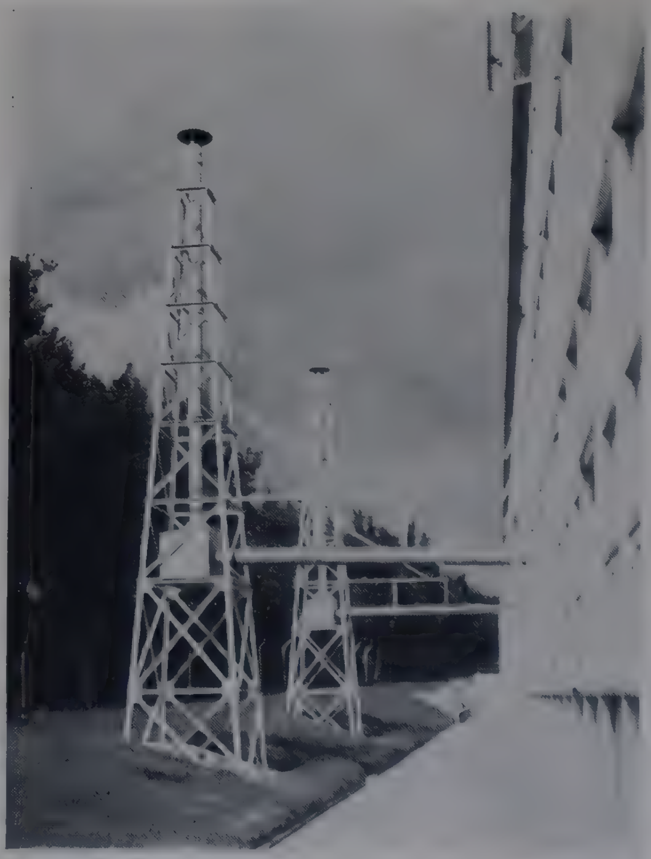
Efficient fume extraction plant is one of the most important features in many chemical laboratories and *Gallenkamp* are specialists in the field of designing, manufacturing and erecting such equipment.

One of the many special extraction plants designed for a particular application is illustrated.

In this case the duty performed is lip extraction from plating vats and as the fumes discharged are particularly noxious it was essential for the outlet to be kept remote from the laboratory.

Gallenkamp are able to offer a service based on many years' experience and specialist engineers are available to advise on the selection of plant and subsequently to prepare designs and estimates.

Quotations will be provided on request.

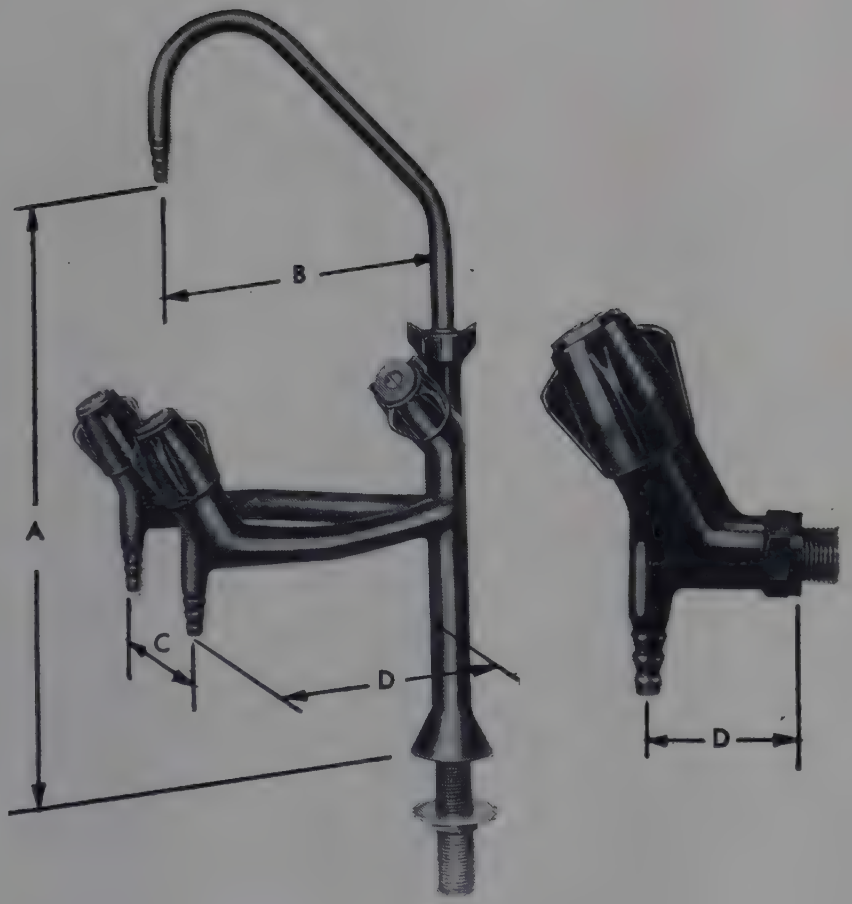


Reproduced by permission of Marconi Co., Chelmsford.

SERVICE CONTROLS FOR WATER, STEAM, GASES, COMPRESSED AIR AND VACUUM

Black plastics corrosion resistant finish. Control heads have distinctive shapes.

Colour and letter coded controls denote service.



GENERAL CONSTRUCTION

This range with its attractive streamlined shape gives improved standouts and nozzle heights. Generally the fittings are manufactured from hard drawn brass tubing, brass pressings and extruded brass bar with the use of more specialised materials where advantageous.

FINISH

The fittings are protected against deterioration by the three coat 'TEKTACOTE' surface finish, which has been developed to give a complete and reliable protection under the range of working conditions normally encountered in Industrial, Educational and Medical Laboratories.

DIMENSIONS

The lettered illustrations on this page identify the dimensions in the tap specifications.

Bib taps. Standout 'D' is measured from the centre line of the nozzle to the inlet flange joint face.

Pillar standards. Standouts 'B' and 'D' are measured from the centre line of the outlet nozzle to the centre line of pillar. Dimension 'C' is measured between the nozzle outlet centres. Height 'A' is measured from the base under surface to the nozzle outlet.

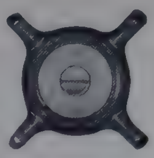
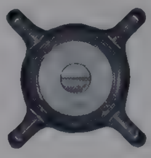
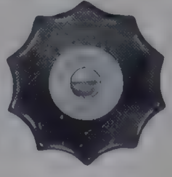
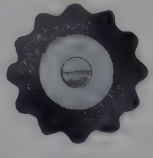
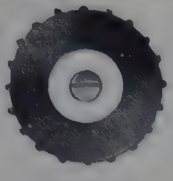
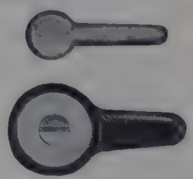
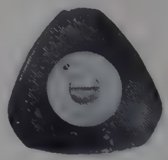
CONNECTING THREADS

Inlet connecting threads are BSP parallel to BS 2779 Class B (ISO R228). Alternative threads or adapters are available. Details on application.

CONTROL HEADS

All handwheels and levers are made from high impact strength plastics and designed to shroud the valve spindles and provide easy-clean shapes. All controls are shaped according to the service and have appropriate coloured disks engraved with code letters as indicated in the panel below.

SERVICE IDENTIFICATIONS

SHAPE OF CONTROL HEAD							
SERVICE	Cold Water	Hot Water	Steam	Vacuum	Compressed Air	Gas (mains)	Other Gases
COLOUR CODE	Azure Blue	Red	Aluminium	Lincoln Green	White	Canary Yellow	Grey
LETTER CODE	C W	H W	S	V	C A	G	

The following do not conform to colour or letter codes, shape or finish indicated.
FY-717 to FY-723 PVC Water fittings. FY-784 Water tap. FY-869 Mixer tap.
All safety drop fan taps.

WATER TAPS

Each tap includes an 'O' ring self-adjusting gland seal, protected non-rotating sealing washer and metering device to give flow control from about 500 ml/min to full bore flow with three turns of the handwheel.

GAS COCKS

The gas cocks incorporated in bench fittings will give long trouble-free service. The plug is spring loaded to remain in adjustment over a long period. All cocks are suitable for town (coal), natural or low pressure LPG (bottled) gases at working pressures up to 24 in (600 mm) w.g.

NEEDLE VALVES

Incorporate non-rising headwork with soft seat and good control characteristics. This design ensures a long life performance and is superior to metal seat valves previously used. For use with compressed air, oxygen, nitrogen or steam.

DIAPHRAGM VALVES

Developed specially for laboratory work. When supplied for vacuum, throttles are fitted to nozzles to restrict throughput to 6 litres/min at 150 torr (25 in Hg).

SERVICE INLET DETAILS

Water fittings inlets are ½ in BSP male thread and all other services have a ¼ in BSP male thread unless otherwise specified. Male inlets are supplied complete with flanged backnuts.

OUTLET DETAILS

Water swan-neck outlets have fixed serrated nozzles as standard.

Removable 'Y' type serrated nozzles are available to special order.

Steam and dry service outlets have fixed serrated nozzles.

INSTALLATION RECOMMENDATIONS

If a water tank is supplied, a minimum head of about 10 metres is required to operate water jet pumps.

It is important to keep compressed air and other service pressures below 1 kgf/cm².

It is essential that all service piping be flushed or blown clear of solid matter before any of the bench valves are fitted.

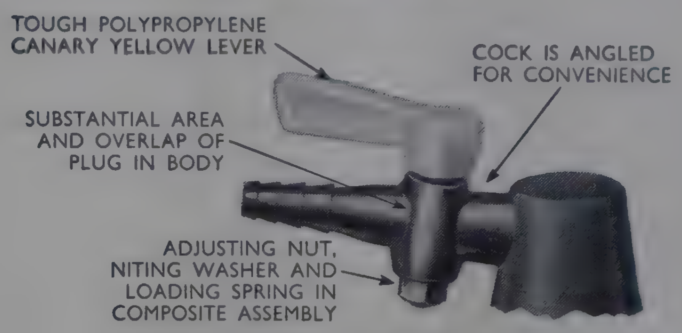
It is desirable that stop valves be fitted so that conveniently small sections of the laboratory can be isolated, both from safety and maintenance viewpoints.

Where a sink is to be used for wash-up purposes, the water supply should be by large bore individual water standards or mixer (FY-668, FY-685, FY-686). Where front controlled valves are used on benches or in fume cupboards, single-way outlets only (FY-794, etc.) are permissible.

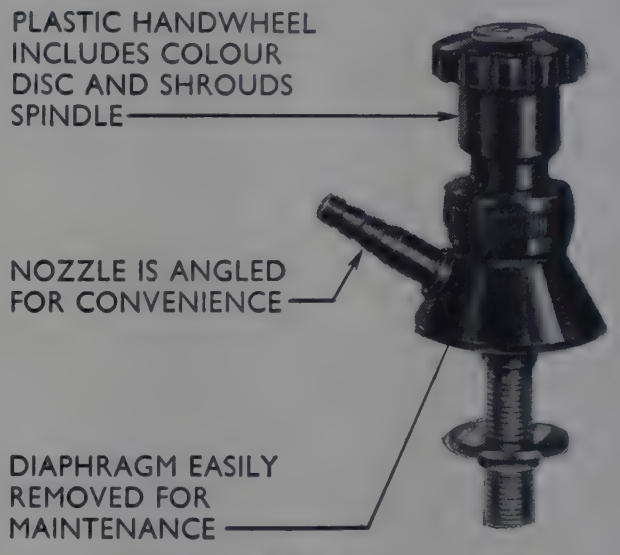
We recommend that a proportion of water fittings are specified with detachable nozzles, to give long term flexibility to the laboratory.

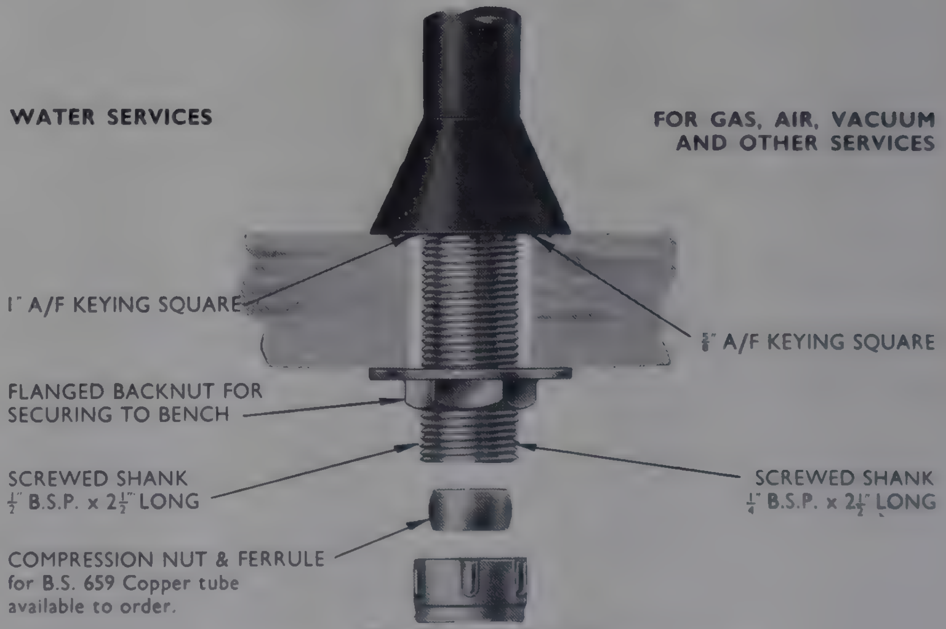
COLOUR DISC
EASYCLEAN POLYPROPYLENE HANDWHEEL

WATER TAPS

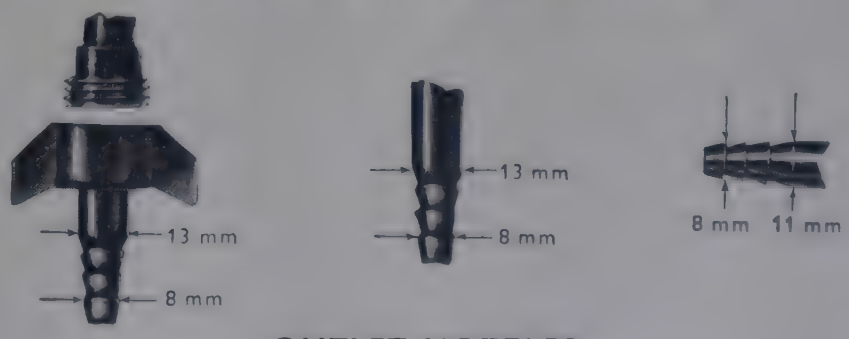

TOUGH POLYPROPYLENE CANARY YELLOW LEVER
COCK IS ANGLED FOR CONVENIENCE
SUBSTANTIAL AREA AND OVERLAP OF PLUG IN BODY
ADJUSTING NUT, NITING WASHER AND LOADING SPRING IN COMPOSITE ASSEMBLY

GAS COCKS


PLASTIC HANDWHEEL INCLUDES COLOUR DISC AND SHROUDS SPINDLE
NOZZLE IS ANGLED FOR CONVENIENCE
DIAPHRAGM EASILY REMOVED FOR MAINTENANCE


WATER SERVICES
FOR GAS, AIR, VACUUM AND OTHER SERVICES
1" A/F KEYING SQUARE
⅝" A/F KEYING SQUARE
FLANGED BACKNUT FOR SECURING TO BENCH
SCREWED SHANK ½" B.S.P. x 2½" LONG
SCREWED SHANK ¼" B.S.P. x 2½" LONG
COMPRESSION NUT & FERRULE for B.S. 659 Copper tube available to order.

INLET DETAILS
BENCH or VERTICAL MOUNTINGS


13 mm
8 mm
13 mm
8 mm
8 mm
11 mm

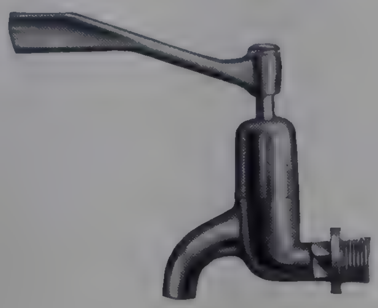
OUTLET NOZZLES

WATER FITTINGS

PIPE MOUNTING

Dimension code see page 306

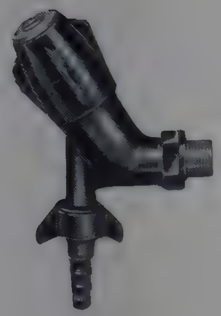
FY-651



FY-652

FY-653

FY-654
FY-655



FY-656

FY-657

FY-658

FY-659

FY-660

FY-661

FY-651
BIB TAP, screw down valve. Inlet ½ in male, outlet plain, with anti-splash. (D = 75 mm).
Ten **£33·00** Each **£3·70** *cx*

FY-652
BIB TAP, wrist action lever. Inlet ½ in male, outlet plain, with anti-splash lever 120 mm. (D = 75 mm).
Ten **£68·00** Each **£7·60** *cx*

FY-653
BIB TAP, screw down valve. Inlet ½ in male, outlet ½ in male complete with nozzle and wing nut for 13 mm bore hose. (D = 75 mm).
Ten **£40·00** Each **£4·50** *cx*

FY-654
BIB TAP, screw down valve. Inlet ½ in male. Serrated nozzle outlet. (D = 45 mm).
Ten **£33·00** Each **£3·70** *cx*

FY-655
BIB TAP, screw down valve. Inlet ⅜ in male, outlet serrated nozzle. (D = 45 mm).
Ten **£33·00** Each **£3·70** *cx*

FY-656
BIB TAP, screw down valve. Inlet ⅜ in male, outlet ½ in male for use with filter pump FY-661. Complete with wing nut and nozzle. (D = 45 mm).
Ten **£38·00** Each **£4·20** *cx*

FY-657
DROP TAP, screw down valve. Inlet ½ in male, outlet serrated nozzle. (D = 90 mm).
Ten **£33·00** Each **£3·70** *cx*

FY-658
DROP TAP, screw down valve. Inlet ½ in male, outlet ½ in male for use with filter pump FY-661. Complete with wing nut and nozzle. (D = 100 mm).
Ten **£38·00** Each **£4·20** *cx*

FY-659
ANGLE TAP, screw down valve. Inlet ⅜ in male, outlet serrated nozzle. (D = 30 mm).
Ten **£33·00** Each **£3·70** *cx*

FY-660
ANGLE TAP, screw down valve. Inlet ⅜ in male, outlet ½ in male for use with filter pump FY-661. Complete with wing nut and nozzle. (D = 30 mm).
Ten **£38·00** Each **£4·20** *cx*

FY-661
FILTER PUMP. ½ in female wing nut connection. Fitted with non-return valve and bleed screw.
Ten **£60·00** Each **£6·60** *cx*

WATER FITTINGS

BENCH MOUNTING

Dimension code see page 306

FY-666

WATER METERING CONTROL VALVE. ½ in female wing nut connection. Will regulate water supply to a slow drip ... ... Ten **£29·50** Each **£3·30** *cx*

FY-667

NOZZLE. ½ in female wing nut connection. Serrated for hose ... ... Ten **£5·00** Each **£0·56** *cx*

FY-668

BIB TAP STANDARD. Plain anti-splash outlet, ½ in male inlet. (A = 230 mm) (B = 150 mm). Ten **£70·00** Each **£7·80** *cx*

FY-669

BIB TAP STANDARD. Plain anti-splash outlet, ½ in male inlet. (A = 305 mm) (B = 150 mm). Ten **£76·00** Each **£8·40** *cx*

FY-670

BIB TAP STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 230 mm) (B = 150 mm). Ten **£70·00** Each **£7·80** *cx*

FY-671

BIB TAP STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 305 mm) (B = 150 mm). Ten **£72·00** Each **£8·00** *cx*

FY-672

ANGLE TAP STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 230 mm) (B = 150 mm). Ten **£76·00** Each **£8·40** *cx*

FY-673

ANGLE TAP STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 305 mm) (B = 150 mm). Ten **£80·00** Each **£8·80** *cx*

FY-674

FIXED SWAN-NECK STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 230 mm) (B = 150 mm). Ten **£64·00** Each **£7·20** *cx*

FY-675

FIXED SWAN-NECK STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 305 mm) (B = 150 mm). Ten **£65·00** Each **£7·20** *cx*

FY-676

FIXED SWAN-NECK STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 380 mm) (B = 150 mm). Ten **£66·00** Each **£7·40** *cx*

FY-677

MOVABLE SWAN-NECK STANDARD. Serrated nozzle outlet, ½ in male inlet. (A = 230 mm) (B = 150 mm) ... ... Ten **£66·00** Each **£7·40** *cx*

FY-678

MOVABLE SWAN-NECK STANDARD. As FY-677 but (A = 305 mm) (B = 150 mm). Ten **£67·00** Each **£7·40** *cx*

FY-679

MOVABLE SWAN-NECK STANDARD. As FY-677 but (A = 380 mm) (B = 150 mm). Ten **£69·00** Each **£7·60** *cx*

FY-680

LARGE BORE, SWIVEL SWAN-NECK STANDARD. Plain anti-splash outlet, ½ in male inlet. (A = 230 mm) (B = 150 mm). Ten **£82·00** Each **£9·00** *cx*

FY-681

SWIVEL ARM JET SPRAY TAP. Inlet ½ in male. (A = 255 mm). Overall length 355 mm. Each **£20·00** *cx*

FY-666

FY-667

FY-668
FY-669

FY-670
FY-671

FY-672
FY-673

FY-674
FY-675
FY-676

FY-677
FY-678
FY-679

FY-680

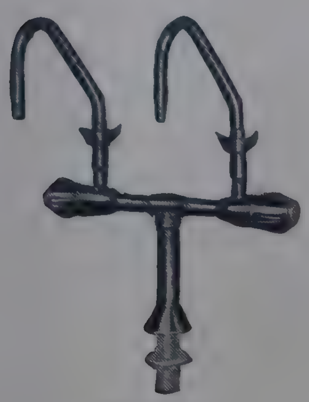
FY-681

WATER FITTINGS

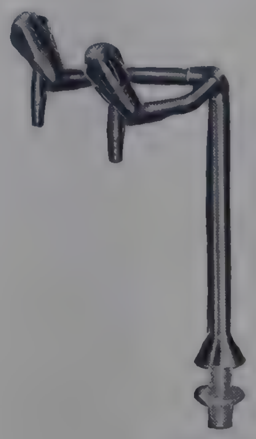
BENCH MOUNTING

(continued)

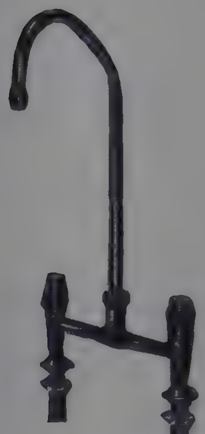
Dimension code see page 306



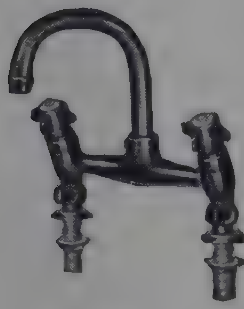
FY-682



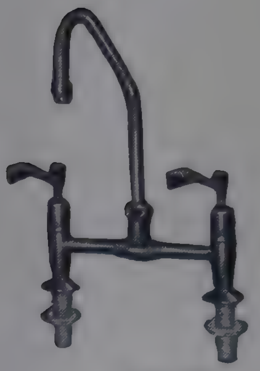
FY-683
FY-684



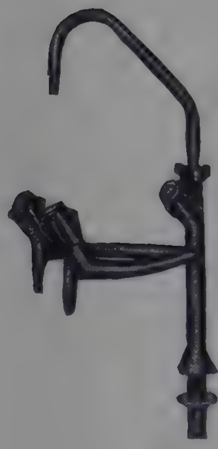
FY-685



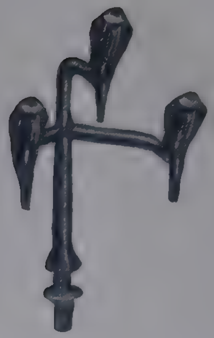
FY-686



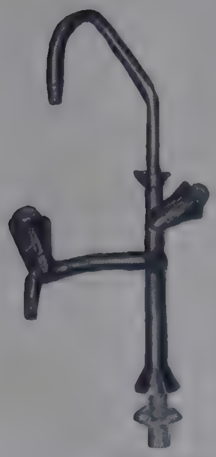
FY-687



FY-688
FY-689



FY-690



FY-691

FY-682

SWAN-NECK STANDARD, two movable swan-necks, serrated nozzle outlets. Inlet ½ in male. (A = 305 mm, B = 150 mm, C = 150 mm). Each **£15·25** *cx*

FY-683

BIB TAP STANDARD, two bib taps, serrated nozzle outlets. Inlet ½ in male. (A = 230 mm, B = 150 mm, C = 150 mm). Each **£12·80** *cx*

FY-684

BIB TAP STANDARD, as FY-683 but (A = 305 mm). Each **£13·00** *cx*

FY-685

MIXER TAP, swivel swan-neck, plain anti-splash outlet, ½ in male inlets at 180 mm centres. (A = 305 mm, B = 150 mm). **Not suitable for mains supply** ... ... Each **£12·60** *cx*

FY-686

DIVIDED FLOW MIXER TAP, swivel swan-neck, outlet. ½ in male inlets at 180 mm centres. (A = 150 mm, B = 180 mm) ... ... Each **£20·50** *cx*

FY-687

MIXER TAP, wrist action lever control, swivel swan-neck, plain anti-splash outlet. ½ in, male inlets at 180 mm centres. (A = 305 mm, B = 150 mm). **Not suitable for mains supply** ... ... Each **£17·50** *cx*

FY-688

SWAN-NECK STANDARD, three way, with movable swan-neck. Two side bib taps. ½ in male inlet. (A = 305 mm, B = 150 mm, C = 150 mm). Each **£18·00** *cx*

FY-689

SWAN-NECK STANDARD, three way, as FY-688 but (A = 380 mm) ... ... Each **£18·20** *cx*

FY-690

BIB TAP STANDARD, three way, with three bib taps. Serrated nozzle outlets. (A = 305 mm, B = 150 mm, C = 150 mm). Each **£18·20** *cx*

FY-691

SWAN-NECK STANDARD, two way, centre movable **swan-neck,** side bib tap, serrated nozzle outlets. (A = 305 mm, B = 150 mm, D = 130 mm). Each **£13·20** *cx*

WATER FITTINGS

VERTICAL SURFACE MOUNTING

Dimension code see page 306

FY-701
BIB TAP FITTING, serrated nozzle outlet, inlet ½ in male. (D = 150 mm) ... ... Each **£6·10** *cx*

FY-702
BIB TAP FITTING, two serrated nozzle outlets, inlet ½ in male. (D = 150 mm, C = 150 mm). Each **£11·30** *cx*

FY-703
BIB TAP FITTING, three serrated nozzle outlets, inlet ½ in male. (D = 150 mm, C = 75 mm). Each **£15·60** *cx*

FY-704
SWAN-NECK FITTING, centre movable swan-neck, two side bib taps. Serrated nozzle outlets, inlet ½ in male. (A = 150 mm, B = 150 mm, C = 150 mm). Each **£18·00** *cx*

FY-705
MIXER TAP, swivel swan-neck, with plain anti-splash outlet, inlets ½ in male at 180 mm centres. (A = 150 mm, B = 195 mm) ... ... Each **£12·30** *cx*

FY-706
FLANGED TAP ADAPTER, to adapt pipe mounting taps ⅜ in male to vertical mounting. Inlet ½ in male. Each **£2·20** *cx*

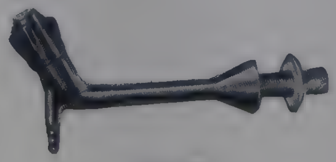
FY-707
FLANGED TAP ADAPTER, as FY-706 but for use with taps screwed ½ in male ... ... Each **£2·70** *cx*

FY-708
SWAN-NECK FITTING, with movable swan-neck, serrated nozzle outlet, inlet ½ in male. (A = 150 mm, B = 115 mm) ... ... Each **£8·20** *cx*

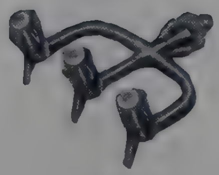
FY-709
SWAN-NECK FITTING, forward fold down, with movable swan-neck, inlet ½ in male. (A = 150 mm, B = 115 mm). Overall length 330 mm. Each **£13·00** *cx*

FY-710
SWAN-NECK FITTING, side fold down, with movable swan-neck, inlet ½ in male. (A = 150 mm, B = 115 mm). Each **£13·00** *cx*

FY-711
DROP FITTING, fitted with two angle taps and one centre drop tap. Serrated nozzle outlets, inlet ½ in male. (B = 75 mm) ... ... Each **£13·50** *cx*

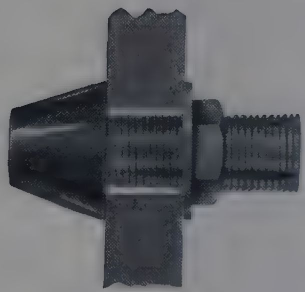

FY-701

FY-702


FY-703

FY-704

FY-705


FY-706
FY-707

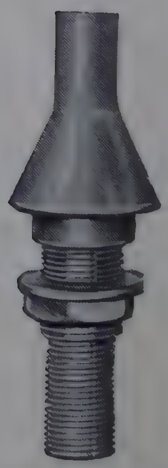
FY-708

FY-709

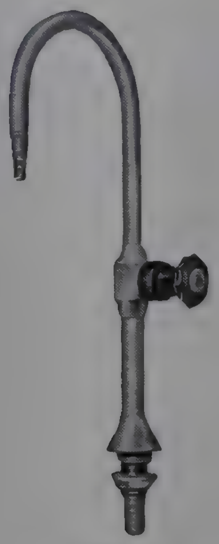
FY-710

FY-711

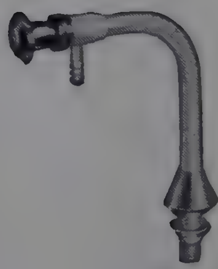
PVC WATER FITTINGS



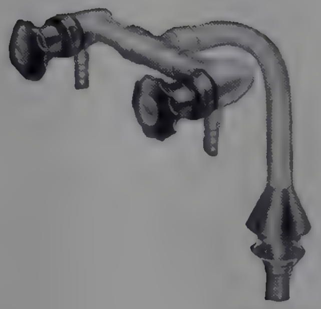
INLET CONNECTION



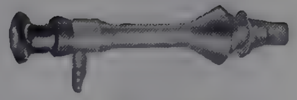
FY-717



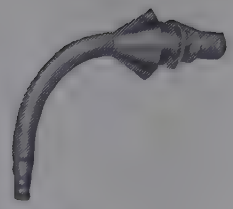
FY-718



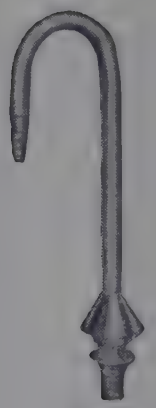
FY-719



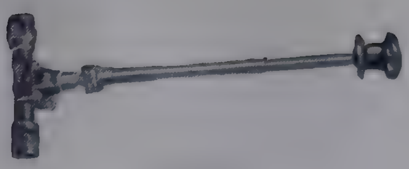
FY-720



FY-722



FY-721



FY-723

Dimension code see page 306.

Designed for demineralised, distilled, sea and corrosive well waters, etc. No metal parts are in contact with the supply liquid.

A diaphragm valve is used for control, with plastics handwheel and coded disk.

DETAIL OF INLET CONNECTION

PVC pillar tube runs through base with ½ in BSP connection. Metal ¾ in BSP bench fixing shank.

FY-717
FIXED SWAN-NECK STANDARD, ½ in male inlet, serrated nozzle outlet. (A = 305 mm, B = 150 mm).
Each **£12·00** *cx*

FY-718
ANGLE VALVE STANDARD, ½ in male inlet, serrated nozzle outlet. (A = 150 mm, B = 150 mm).
Each **£10·20** *cx*

FY-719
ANGLE VALVE STANDARD, ½ in male inlet, serrated nozzle outlets.
(A = 150 mm, B = 150 mm, C = 150 mm).
Each **£22·20** *cx*

FY-720
ANGLE VALVE FITTING, ½ in male inlet, serrated nozzle outlet. (B = 150 mm) ... ... Each **£9·00** *cx*

FY-721
SWAN-NECK OUTLET, ½ in male inlet, serrated nozzle outlet. (A = 150 mm, B = 150 mm).
Each **£8·20** *cx*
For use with FY-723 control valve.

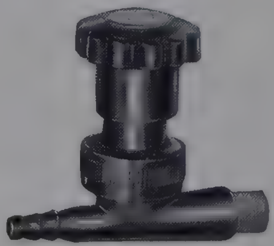
FY-722
VERTICAL MOUNTING OUTLET, ½ in male inlet, serrated nozzle outlet. (B = 150 mm)... Each **£6·80** *cx*
For use with FY-723 control valve.

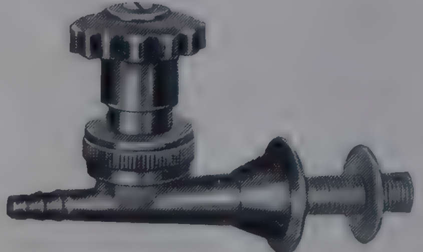
FY-723
CONTROL VALVE. ½ in female connection, with extended spindle adjustable for lengths from 510 mm to 760 mm. For use with FY-721 and FY-722 outlets.
Each **£12·70** *cx*

DIAPHRAGM CONTROL VALVES

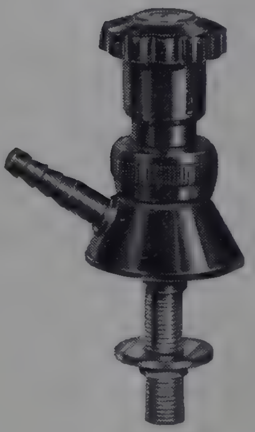
For vacuum and pressure gases up to 7 kgf/cm²

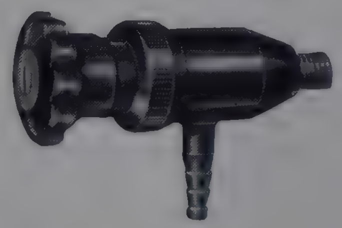
FY-741
IN-LINE VALVE (pipe mounting). ¼ in male inlet.
Serrated nozzle outlet ... Ten **£33·00** Each **£3·70** *cx*


FY-741


FY-742

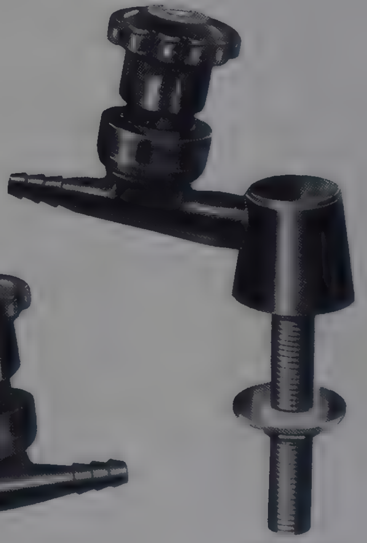
FY-742
VERTICAL MOUNTING VALVE. ¼ in male inlet.
Serrated nozzle outlet ... Ten **£44·00** Each **£4·90** *cx*


FY-743

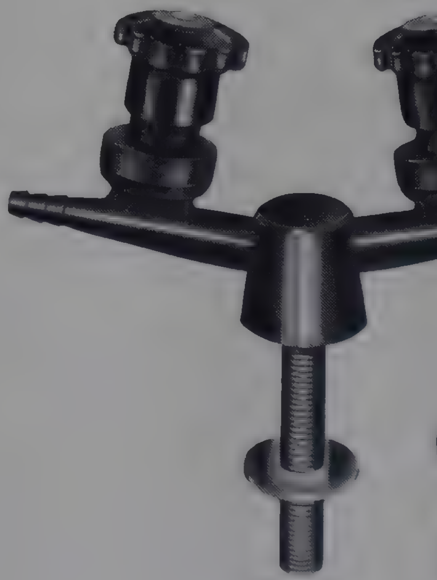

FY-744

FY-743
BENCH MOUNTING VALVE. ¼ in male inlet.
Serrated nozzle outlet ... Ten **£43·00** Each **£4·80** *cx*

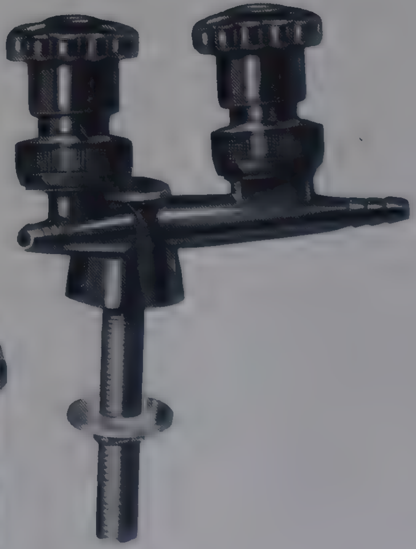
FY-744
ANGLE VALVE (pipe mounting). ¼ in male inlet.
Serrated nozzle outlet ... Ten **£35·00** Each **£3·90** *cx*


FY-745

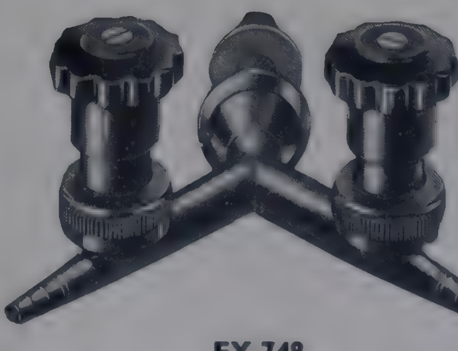
FY-745
BENCH MOUNTING VALVE. ¼ in male inlet.
Serrated nozzle outlet ... Ten **£52·00** Each **£5·80** *cx*


FY-746

FY-746
TWO WAY BENCH MOUNTING VALVE.
¼ in male inlet. Serrated nozzle outlets 180° apart.
Ten **£80·00** Each **£9·00** *cx*


FY-747

FY-747
TWO WAY BENCH MOUNTING VALVE.
¼ in male inlet. Serrated nozzle outlets 90° apart.
Ten **£80·00** Each **£9·00** *cx*


FY-748

FY-748
TWO WAY VERTICAL MOUNTING VALVE.
¼ in male inlet. Serrated nozzle outlets 90° apart.
Ten **£84·00** Each **£9·40** *cx*

COMPRESSED AIR AND STEAM VALVES

FY-756

FY-758

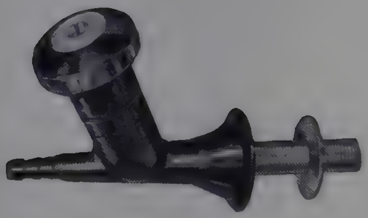
PIPE MOUNTING

FY-756
COMPRESSED AIR ANGLE VALVE, inlet ¼ in male, outlet serrated nozzle ... Ten **£40·00** Each **£4·50** *cx*

FY-757
STEAM ANGLE VALVE, inlet ¼ in male, outlet serrated nozzle ... ... Ten **£45·00** Each **£5·00** *cx*

FY-758
COMPRESSED AIR IN-LINE VALVE, inlet ¼ in male, outlet serrated nozzle ... Ten **£38·00** Each **£4·20** *cx*

FY-759
STEAM IN-LINE VALVE, inlet ¼ in male, outlet serrated nozzle ... ... Ten **£38·00** Each **£4·20** *cx*



FY-760

FY-761

VERTICAL SURFACE MOUNTING

FY-760
COMPRESSED AIR VALVE, inlet ¼ in male, outlet serrated nozzle ... ... Ten **£47·00** Each **£5·20** *cx*

FY-763

BENCH MOUNTING

FY-761
COMPRESSED AIR VALVE, inlet ¼ in male, outlet serrated nozzle ... ... Ten **£42·00** Each **£4·70** *cx*

FY-763
COMPRESSED AIR VALVE, two-way, inlet ¼ in male, outlets serrated nozzles set 180° apart.
Ten **£86·00** Each **£9·60** *cx*

FY-764

FY-764
STEAM VALVE, swan-neck standard, inlet ¼ in male, outlet serrated nozzle. (A = 100 mm, B = 115 mm).
Ten **£68·00** Each **£7·40** *cx*

Dimension code see page 306.

FRONT CONTROLLED SERVICE FITTINGS

COMBINED HANDWHEEL AND OUTLET NOZZLE

Suitable for front panel mounting.

FY-771
GAS COCK, inlet ¼ in female. Integral serrated nozzle mounted on 100 × 60 mm back plate.
Ten **£53·00** Each **£5·90** *cx*

FY-772
VACUUM DIAPHRAGM VALVE, inlet ¼ in female. Integral serrated nozzle mounted on 100 × 60 mm back plate ... ... Ten **£72·00** Each **£8·00** *cx*

FY-773
COMPRESSED AIR NEEDLE VALVE, inlet ¼ in female. Integral serrated nozzle mounted on 100 × 60 mm back plate ... ... Ten **£74·00** Each **£8·20** *cx*

FY-771

FY-773
(FY-772 is similar)

FY-774

EXTENDED SPINDLE TYPE

Adjustable for lengths from 510 mm to 760 mm.
Cocks and valves complete with black bench bearing bush, handwheel and coloured service insert.

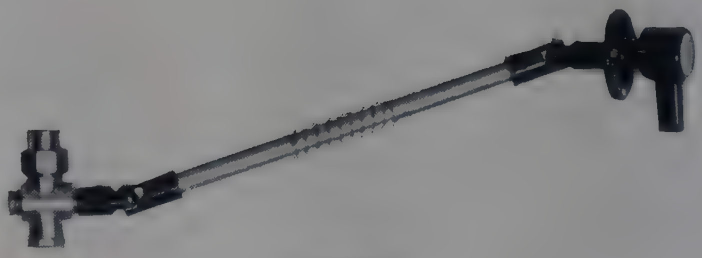
FY-774
WATER TAP, inlet and outlet ½ in female.
Ten **£40·00** Each **£4·40** *cx*

FY-775
STEAM VALVE, inlet and outlet ¼ in female.
Ten **£68·00** Each **£7·60** *cx*

FY-776
GAS COCK, inlet and outlet ¼ in female.
Ten **£38·00** Each **£4·30** *cx*

FY-777
VACUUM DIAPHRAGM VALVE, inlet and outlet ¼ in female ... ... Ten **£50·00** Each **£5·60** *cx*

FY-778
COMPRESSED AIR NEEDLE VALVE, inlet and outlet ¼ in female ... ... Ten **£64·00** Each **£7·20** *cx*


FY-776

FY-777

FY-778

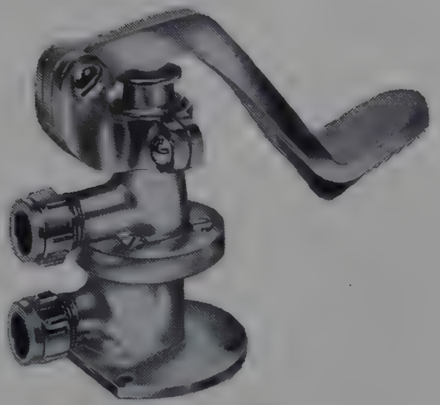
FRONT CONTROLLED SERVICE FITTINGS

Pipe connection type for front panel mounting

FY-779

FY-781
(FY-780 is similar)

FY-782



FY-784

FY-779
WATER FITTING, inlet $\frac{1}{2}$ in BSP male, outlet $\frac{1}{2}$ in BSP female, mounted on 100 × 60 mm back plate.
Ten **£53·00** Each **£5·90** *cx*

FY-780
STEAM VALVE, inlet and outlet $\frac{1}{4}$ in female, mounted on 100 × 60 mm back plate.
Ten **£68·00** Each **£7·60** *cx*

FY-781
COMPRESSED AIR NEEDLE VALVE, fittings as FY-780 ... ... Ten **£68·00** Each **£7·60** *cx*

FY-782
GAS COCK, inlet and outlet $\frac{1}{4}$ in female, mounted on 100 × 60 mm back plate ... Ten **£40·00** Each **£4·50** *cx*

FY-783
VACUUM DIAPHRAGM VALVE, inlet and outlet $\frac{1}{4}$ in female, mounted on 100 × 60 mm back plate.
Ten **£63·00** Each **£7·00** *cx*

FY-784
WATER FITTING, cold or hot, foot pedal operated. Self closing non-concussive valve. Flange drilled for floor or panel fixing. Inlet and outlet at back of valve has unions for $\frac{1}{2}$ in copper tube. Chromium plated finish.
Each **£17·50** *cx*

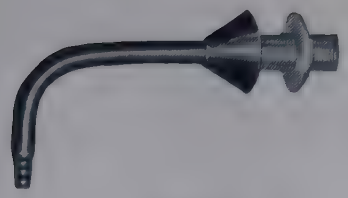
NOZZLES FOR FRONT CONTROLLED SERVICE FITTINGS

Swan-necks and nozzles colour coded to match disk inserts on control heads.
When ordering the service should be specified for the correct colour to be supplied.

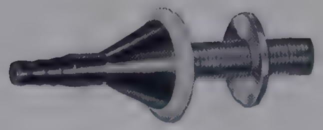
FY-790

FY-794

FY-793



FY-791
FY-792



FY-795

FY-790
SWAN-NECK, bench mounting, inlet $\frac{1}{2}$ in male, for use with front control water fittings. Inlet $\frac{1}{4}$ in male for steam fittings ... ... Ten **£40·00** Each **£4·50** *cx*

FY-791
SWAN-NECK, vertical mounting, inlet $\frac{1}{2}$ in male, for use with front control water fittings. Inlet $\frac{1}{4}$ in male for steam fittings. Standout 60 mm.
Ten **£40·00** Each **£4·50** *cx*

FY-792
SWAN-NECK, vertical mounting, as FY-791 but having 115 mm standout ... Ten **£40·00** Each **£4·50** *cx*

FY-793
SWAN-NECK, vertical mounting, fold down movable swan-neck. Inlet $\frac{1}{2}$ in male ... ... Each **£10·25** *cx*

FY-794
NOZZLE, bench mounting, inlet $\frac{1}{4}$ in male for use with front control gas, air and vacuum fittings.
Ten **£21·00** Each **£2·35** *cx*

FY-795
NOZZLE, vertical mounting, inlet $\frac{1}{4}$ in male, for use with front control gas, air and vacuum fittings.
Ten **£17·50** Each **£1·95** *cx*

GAS FITTINGS

FY-801

LEVER HANDLE COCK, pipe mounting.

Screwed	⅛	¼ in male	
Ten	£9·80	10·00	cx
Each	£1·10	1·12	

FY-802

VERTICAL MOUNTING COCK, single way. Inlet ¼ in male. Serrated nozzle outlet.
Ten **£24·00** Each **£2·70** *cx*

FY-803

VERTICAL MOUNTING COCK, two way. Inlet ¼ in male. Serrated nozzle outlets 90° apart.
Ten **£35·00** Each **£3·90** *cx*

FY-804

TWO WAY LEVER HANDLE COCK pipe mounting. Inlet ¼ in male. Serrated nozzle outlets 90° apart.
Ten **£29·00** Each **£3·20** *cx*

FY-805

SINGLE BENCH COCK. Inlet ¼ in male. Serrated nozzle outlet. Colour code lever and base flange.
Ten **£25·00** Each **£2·80** *cx*

FY-806

TWO WAY BENCH COCK. Inlet ¼ in male. Serrated nozzle outlets 90° apart. Colour code lever and base flange ... ... Ten **£33·00** Each **£3·70** *cx*

FY-807

TWO WAY BENCH COCK. As FY-806 but nozzles 180° apart ... ... Ten **£33·00** Each **£3·70** *cx*

FY-808

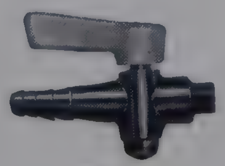
THREE WAY BENCH COCK. Inlet ¼ in male. Serrated nozzle outlets 120° apart. Colour code lever and base flange ... ... Ten **£42·00** Each **£4·70** *cx*

FY-809

THREE WAY BENCH COCK. Inlet ¼ in male. Serrated nozzle outlets 90° apart. Colour code lever and base flange ... ... Ten **£42·00** Each **£4·70** *cx*

FY-810

FOUR WAY BENCH COCK. Inlet ¼ in male. Serrated nozzle outlets 90° apart. Colour code lever and base flange ... ... Ten **£51·00** Each **£5·70** *cx*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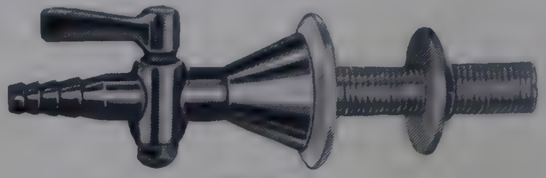
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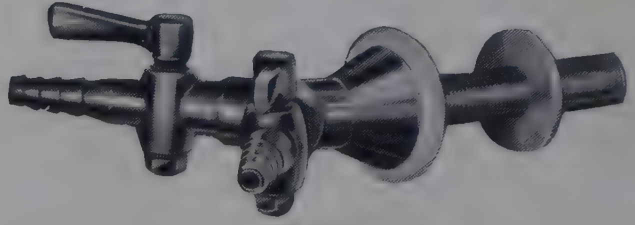
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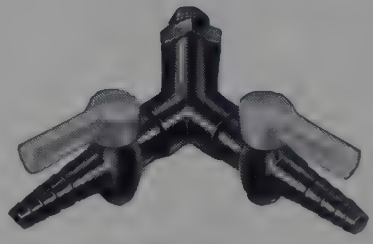
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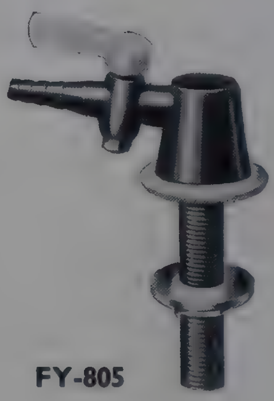
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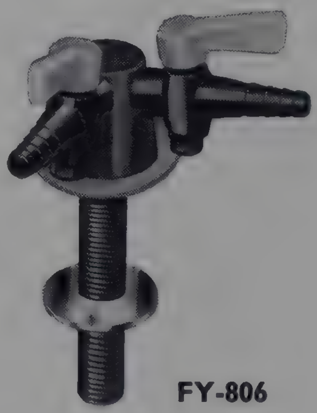
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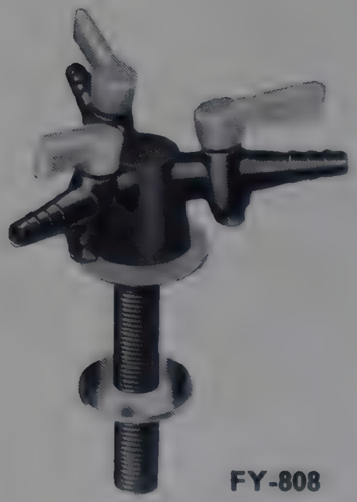
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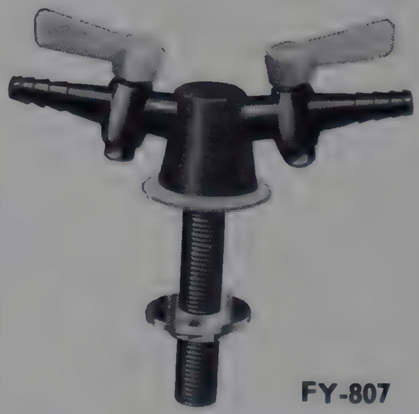
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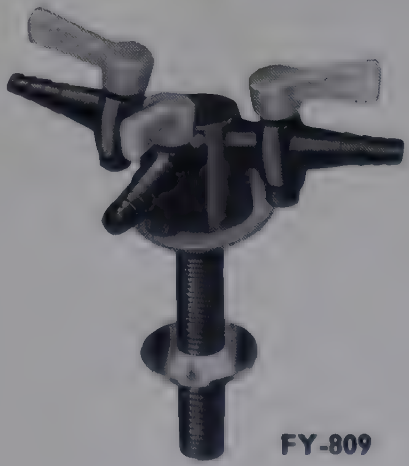
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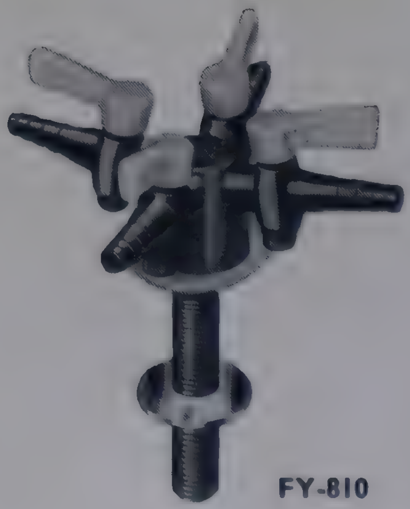

FY-810

GAS FITTINGS

SAFETY DROP LEVER TAPS

FY-817

FY-818

FY-816

GAS COCK, pipe mounting, single way, drop lever, screwed ¼ in male... ...Ten **£14·00** Each **£1·55** *cx*

FY-817

GAS COCK, bench mounting, single way, drop lever, screwed ¼ in male... ...Ten **£26·00** Each **£2·90** *cx*

FY-818

GAS COCK, bench mounting, two way, 90° drop lever, screwed ¼ in male... ...Ten **£40·00** Each **£4·50** *cx*

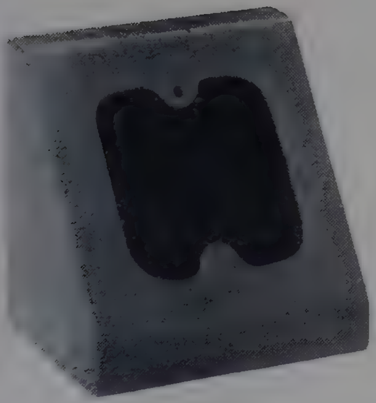
FY-819

GAS COCK, bench mounting, as FY-818 but three way, cocks 90° apart. Screwed ¼ in male. Ten **£54·00** Each **£6·00** *cx*

FY-820

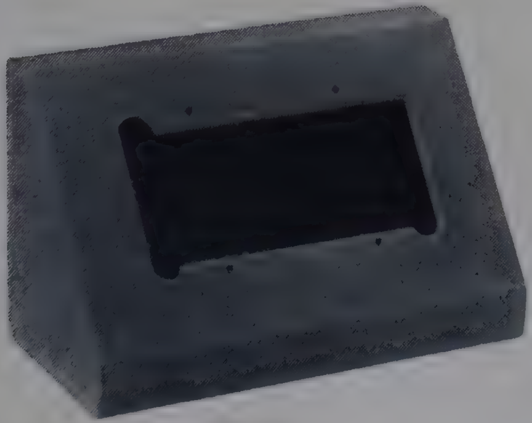
GAS COCK, bench mounting, as FY-818 but four way, cocks 90° apart. Screwed ¼ in male. Ten **£68·00** Each **£7·60** *cx*

ELECTRICAL FITTINGS



FY-840

FY-840 with socket



FY-841

Overall dimensions, nominal

	H	W	D
FY-840	115 ×	115 ×	90 mm
FY-841	115 ×	210 ×	90 mm
FY-842	115 ×	115 ×	180 mm
FY-843	115 ×	210 ×	180 mm

MOUNTING BOXES

For 3-pin flush mounting socket outlets to BS 1363 and BS 546 manufactured by *M.E.M. Ltd.*

FY-840

MOUNTING BOX, PVC, single sided, one-gang, for mounting on a wall bench at the junction of wall and bench top. Accepts but **does not include** a flush mounting, one-gang, 3-pin socket outlet manufactured by *M.E.M. Ltd.* ... ... Each **£1·05** *cx*

FY-841

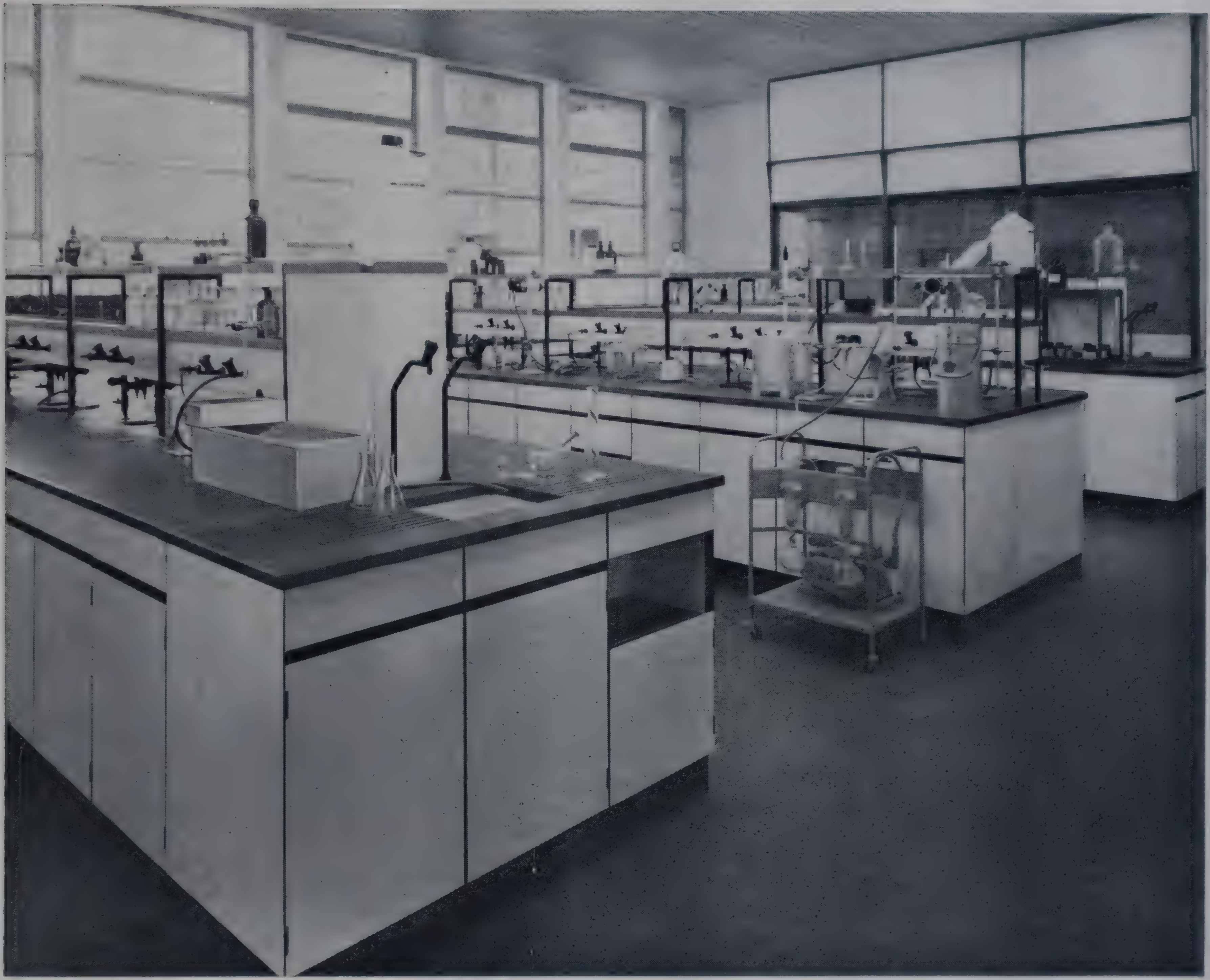
MOUNTING BOX, PVC, single sided, two-gang, for mounting on a wall bench at the junction of wall and bench top. Accepts but **does not include** a flush mounting, two gang, 3-pin socket outlet manufactured by *M.E.M. Ltd.* ... ... Each **£1·75** *cx*

FY-842

MOUNTING BOX, PVC, double sided, one-gang, for mounting on centre line of island benches. Accepts but **does not include** two flush mounting, one-gang, 3-pin socket outlets manufactured by *M.E.M. Ltd.* Each **£1·95** *cx*

FY-843

MOUNTING BOX, PVC, double sided, two-gang, for mounting on centre line of island benches. Accepts but **does not include** two flush mounting, two-gang, 3-pin socket outlets manufactured by *M.E.M. Ltd.* Each **£2·85** *cx*

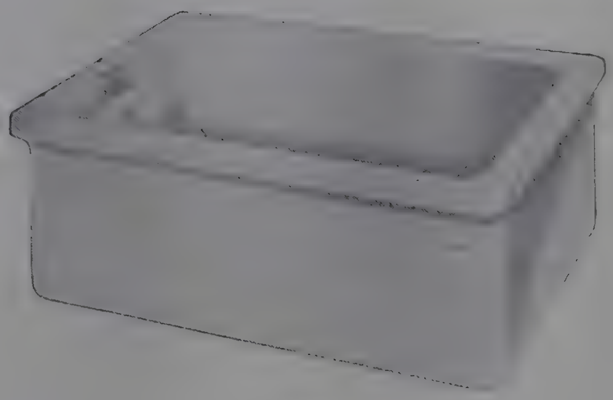


Gallenkamp furniture installation for Roche Products Ltd., Dalry, Ayrshire, by whose courtesy this photograph is reproduced. It shows part of one of several rooms comprising a comprehensively equipped laboratory suite.

Series FX 103 melamine plastics faced units were selected for the island and wall benches. The reagent bottle shelves house a duct for eight supply services, with a multiplicity of face mounting and pendant outlet terminals. This arrangement provides clear work tops—which are of teak.

A bank of three 'Openflow II' fume cupboards can be seen in the background. These are balanced draught models, designed to conserve conditioned air within the laboratory and each has a two stage by-pass which automatically controls air velocity beneath sashes as they are lowered. Efficient fume scavenging and extremely high resistance to corrosion are major features.

SINKS



FY-860

FY-860

SINKS, white vitreous glazed fireclay, with ½ in rim projection all round, and 3 in flanged outlet with combined open weir overflow in centre at one end. White inside and out.

Overall dimensions (Length and width measured under rim) L × W × D mm	Each	
	£	
205 × 150 × 150	**5·90**	*mx*
255 × 205 × 150	**5·90**	*mx*
305 × 255 × 150	**5·90**	*mx*
305 × 305 × 180	**6·50**	*mx*
405 × 280 × 150	**6·50**	*mx*
430 × 330 × 150	**6·50**	*mx*
510 × 305 × 150 †	**6·50**	*mx*
585 × 355 × 205 †	**10·55**	*mx*

† These sizes should be supported on wood bearers or stools. Full details and prices on application.

ACCESSORY

FY-861	**Straps, metal, to support sinks FY-860 up to size 430 × 330 × 150 mm** ... ... Pair	**£0·90**	*mx*

WATER DEIONISERS see DH-604 et seq.

WATER STILLS see DT-584 et seq.

For details and prices see entries in List No. sequence.

FY-862

SINKS, white vitreous glazed fireclay, with 3½ in chamfered outlet and combined open weir overflow in centre at one end. White inside and out.

Overall dimensions L × W × D mm	Each	
	£	
455 × 380 × 205	**7·00**	*mx*
535 × 405 × 205	**8·80**	*mx*
610 × 405 × 205	**8·80**	*mx*
610 × 455 × 205	**9·60**	*mx*
760 × 455 × 205	**16·50**	*mx*
535 × 405 × 255	**10·50**	*mx*
610 × 405 × 255	**10·50**	*mx*
610 × 455 × 255	**10·50**	*mx*
685 × 455 × 255	**13·80**	*mx*
760 × 455 × 255	**16·50**	*mx*
760 × 510 × 255	**18·10**	*mx*
915 × 455 × 255	**20·00**	*mx*
915 × 510 × 255	**20·60**	*mx*
915 × 610 × 255	**27·00**	*mx*
1065 × 610 × 255	**35·50**	*mx*
915 × 610 × 305	**35·50**	*mx*

FY-862

WASH-HAND BASIN

FY-865

WASH-HAND BASIN, white vitreous glazed china, 660 × 455 mm, with left-hand soap dish and recessed outlet ... ... Each **£13·20** *mx*

FY-866

CANTILEVER BRACKETS, set of two, semi-concealed, cast iron, to screw on to wall ... ... Set **£3·25** *mx*

FY-867

WASTE OUTLET, 1¼ in, chromium plated brass, with standing tube overflow ... ... Each **£6·00** *mx*

FY-868

BOTTLE TRAP, 1¼ in, chromium plated brass. Each **£4·15** *mx*

FY-869

WATER STANDARD, swan-neck, for mixing hot and cold water. ½ in male inlets at 205 mm centres, antisplash outlet. Wrist action lever handles. Chromium plated brass ... ... Each **£29·50** *cx*

FY-865, FY-867, FY-869

STAINLESS STEEL SINKS

FY-875

SINK BOWLS, seamless, pressed from 20 gauge FDP material. Internal corners radiused. Top edges have a 25 mm wide flat flange all round. Satin polished finish inside and on face of flanges. All bowls have waste sinkage at the back centre, except size 230 × 355 × 180 mm where it is centrally placed. Complete with 1½ in stainless steel outlet, plug, chain, and integral overflow, except for size 230 × 355 × 180 mm which has a 1½ in stainless steel waste plug and chain only.

FY-875

Overall dimensions	Each	
L W D	£	
230 × 355 × 180 mm	16·50	*mx*
430 × 355 × 180 mm	17·00	*mx*
510 × 355 × 180 mm	17·50	*mx*
535 × 380 × 205 mm	21·20	*mx*

Stainless steel sinks with or without draining boards can be supplied in larger sizes and in pairs for washing and rinsing. Details of sizes available and prices on application.

RECEIVERS

FY-878

RECEIVERS, vitreous glazed fireclay, white inside and out. With integral fireclay outlet horn and siphon.

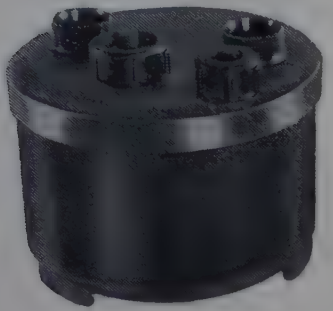
External sizes	280 × 280 × 280	330 × 330 × 330 mm	
Each	**£11·80**	**13·00**	*mx*

For Recovery Trap/Receiver, Waste Outlets, etc., in polythene see overleaf.

FY-878

SINK FITTINGS

All the polythene plumbing fittings have connections with Kauthene buttress type threads unless otherwise indicated. The standard size 1¼ in and 1½ in Kauthene thread will not match BSP screwed fittings; the appropriate Kauthene fitting must be used. Hot jointing of polythene pipe to the connectors is easily effected by use of fusion tools FY-915 and FY-916.



FY-885

FY-886
FY-887

FY-888

FY-889

FY-890
FY-891

FY-896

FY-895

CATCHPOT

FY-885

CATCHPOT RECOVERY TRAP AND DILUTION RECEIVER, black polythene, 8 litres capacity. Two inlets and one outlet screwed 1½ in Kauthene thread; complete with blank cap on one outlet. Each **£9·75** *cx*

FY-886

LOOSE NUT SOCKET INLET, black polythene, for pipe connection, screwed 1½ in Kauthene thread. Each **£0·45** *cx*

FY-887

LOOSE NUT SOCKET INLET, black polythene, for pipe connection, screwed 1¼ in Kauthene thread. Each **£0·45** *cx*

FY-888

COUPLER REDUCER, black polythene, 1½ in to 1¼ in Kauthene thread ... ... Each **£0·45** *cx*

FY-889

ELBOW, black polythene, 90°, screwed 1½ in Kauthene thread ... ... Each **£0·60** *cx*

WASTE OUTLETS

FY-890

WASTE OUTLET, black polythene, 3 in diameter flange, with stopper, strainer and shrouded backnut, also slotted for overflow. Screwed 1¼ in Kauthene thread. **Without pipe connector.** Suitable for sinks FY-860. Each **£0·75** *cx*

FY-891

WASTE OUTLET, black polythene, 3½ in diameter chamfered flange, with stopper, strainer and shrouded backnut, also slotted for overflow. Screwed 1½ in Kauthene thread. **Without pipe connector.** Suitable for sinks FY-862 ... ... Each **£0·85** *cx*

FY-892

WASTE OUTLET, black polythene, short type, 3½ in diameter flange, complete with stopper, strainer and backnut. For use with 'thin section' vessels, unslotted and may be drilled for slot on site. Screwed 1½ in BSP thread. **Without pipe connector** ... Each **£0·75** *cx*

DRIP WASTES

FY-895

DRIP WASTE, black polythene, with 3 in diameter flange; complete with strainer and backnut but **without pipe connector.** Screwed 1¼ in Kauthene thread. Each **£1·10** *cx*

FY-896

DRIP WASTE, black polythene, with 4 in circular flange; complete with removable anti-splash top to retain rubber or polythene tubes. Fitted large backnut but **without pipe connector.** Screwed 1½ in Kauthene thread ... ... Each **£1·35** *cx*

SINK FITTINGS

DRIP WASTES

(continued)

FY-897

DRIP WASTE, black polythene, circular with 6 in (152 mm nominal) square flange. Complete with strainer and large backnut but **without pipe connector.** Screwed 1½ in Kauthene thread ... ... Each **£4·10** *cx*

FY-898

DRIP WASTE, black polythene, oval cup overall 8×4 in (204×102 mm nominal). Complete with strainer and retaining clips but **without pipe connector.** Screwed 1½ in Kauthene thread... ... Each **£2·60** *cx*

FY-899

DRIP CUP, black polythene, oval cup with rectangular flange overall 8×4 in (204×102 mm nominal). Complete with strainer and retaining clips but **without pipe connector.** Screwed 1½ in Kauthene thread. Each **£2·75** *cx*

FY-897

WASTE UNITS

FY-905

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity about 500 ml. Inlet **loose nut** coupler screwed 1¼ in Kauthene thread, outlet screwed 1½ in Kauthene thread. Complete with socket inlet FY-886 ... ... Each **£2·00** *cx*

FY-906

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity about 500 ml. Inlet with **fixed nut** coupler screwed 1¼ in BSP thread, outlet screwed 1½ in Kauthene thread. Complete with socket inlet FY-886 ... ... Each **£1·75** *cx*

FY-907

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity about 500 ml. Inlet and outlet fitted **loose nut** couplers, screwed 1½ in Kauthene thread ... ... Each **£2·10** *cx*

FY-908

WASTE TRAP UNIT, black polythene, with detachable catchpot base, capacity about 500 ml. Inlet with **fixed nut** coupler screwed 1½ in BSP thread, outlet coupler 1½ in Kauthene thread ... ... Each **£1·90** *cx*

FY-898
FY-899

PIPE

FY-910

PIPE, black polythene, normal gauge, internal diameter 1¼ in. Supplied cut to length required up to a maximum of 3 metres ... ... Per metre **£0·60** *cx*

FY-911

PIPE, black polythene, as FW-516 but internal diameter 1½ in ... ... Per metre **£0·80** *cx*

FY-905
FY-906

FUSION TOOLS

FY-915

FUSION TOOL, for hot jointing of polythene pipe to couplers, 1¼ in size ... ... Each **£2·60** *cx*

FY-916

FUSION TOOL, as above, but 1½ in size. Each **£3·20** *cx*

FY-915
FY-916

BENCH TROUGHS AND BOTTLE RACKS

FY-930

FY-930

BENCH TROUGH, island type, rigid PVC. Dimensions 915 mm long × 100 mm wide internally; 50 mm high × 100 mm high at stop end. With recessed hole to accommodate but not including waste outlet... Each **£13·70** *fxN*

TROUGHS, as above, can be supplied to alternative lengths as required; also, where specified, with back skirting for wall mounting. Price on application.

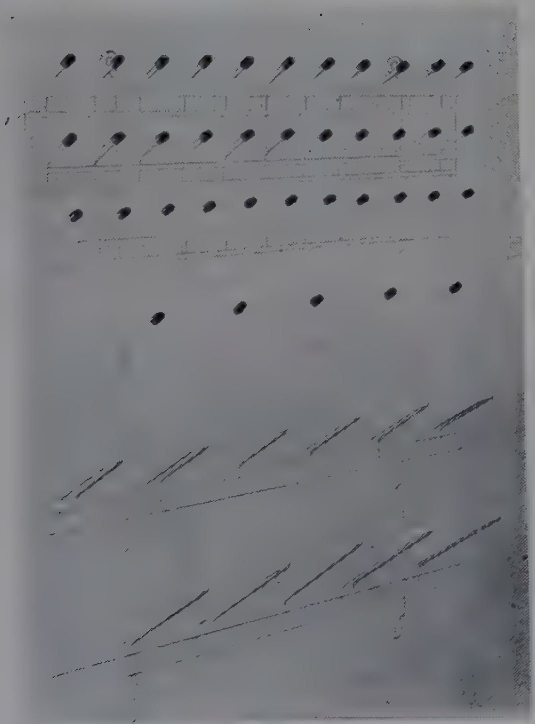
FY-932

FY-932

WINCHESTER QUART BOTTLE RACK, rigid PVC. To fit 1000 mm wide cupboard ... Each **£21·50** *fxN*

RACKS, as above, can be supplied to alternative lengths, as required. Price on application.

DRAINING BOARDS AND RACKS



FY-935

FY-936

FY-935

PEG DRAINING RACKS, wall mounting, polythene coated metal frame with sloped pegs. Angled fitting brackets support the racks about 25 mm away from the wall surface. Size 560 × 560 mm ... Each **£3·00** *bx*

FY-936

PEG DRAINING RACKS. Teak, with seventeen sloped pegs.

Size	610 × 380	760 × 610 mm	
Each	**£6·80**	**9·40**	*mx*

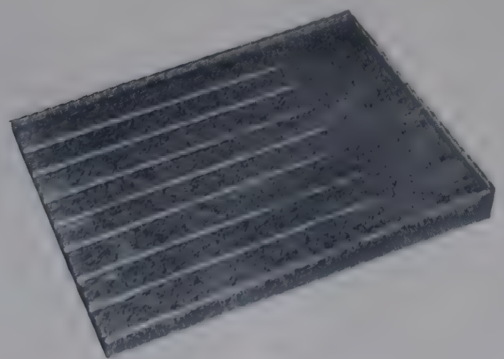
FY-938

DRAINING BOARDS. Teak, grooved.

Size	610 × 450	760 × 530	910 × 610 mm	
Each	**£6·50**	**8·00**	**10·50**	*mx*

FY-939

MAT, draining, polythene, for use on bench or draining board. Reduces glassware breakage. Size 440 × 350 mm. Each **£0·75** *cx*



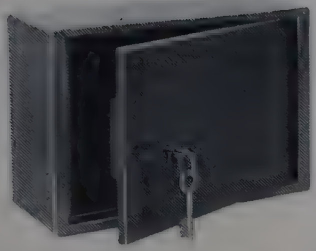
FY-938

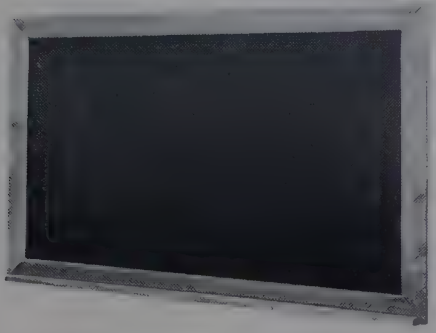
DRAINING AND DRYING APPARATUS
see WD-170 et seq.

WASTE BINS, SACKS AND HOLDERS
see WD-400 et seq.

For details and prices see entries in List No. sequence.

LABORATORY ACCESSORIES


FY-945


FY-946

FY-947

FY-945

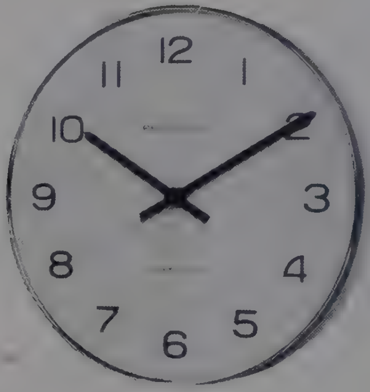
SAFE, wall fitting, welded steel body with mounting lugs. The bolt shoots behind the front rebate and the door is hung on concealed pivots. External dimensions, 220 mm wide × 100 mm deep × 160 mm high. Each **£15·00** *mx*

FY-946

BLACKBOARD, oak framed, with black writing surface on hardboard ground and chalk trough. 910 mm wide × 610 mm high ... ... Each **£10·50** *mx*

FY-947

CARD FRAME, 76 × 45 mm, black plastics, for labelling drawers and cupboards. Complete with cards and fixing screws. In pack of 10
10 Packs **£4·70** Pack **£0·52** *cx*

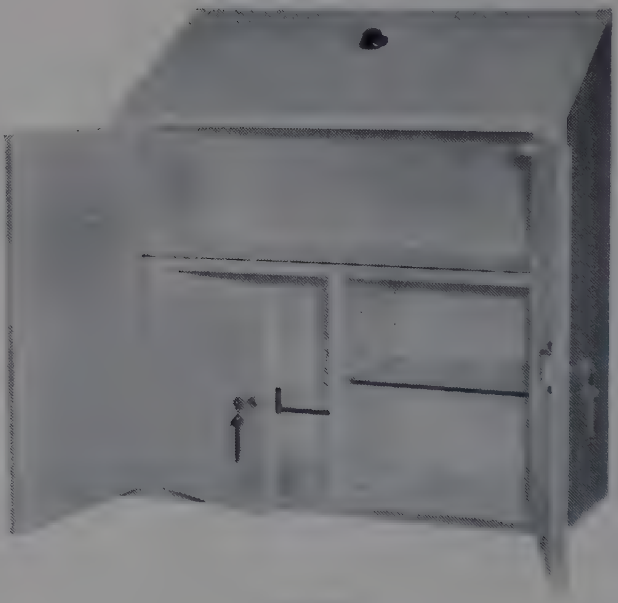

FY-948
(FY-949 is similar)

FY-948

WALL CLOCK, electric, with silver grey metal case, 230 mm dial and sweep second hand. For 200/250V a.c. single phase supply ... ... Each **£7·90** *mx*

FY-949

WALL CLOCK, battery, white stove enamelled metal case with 230 mm dial, similar appearance to FY-948. Requires 1½V battery ... ... Each **£10·75** *mx*


FY-955

FY-955

POISONS CUPBOARD, in accordance with BS 2881 for the storage of poisons and dangerous drugs. Timber construction 785 mm high × 715 mm wide × 280 mm deep with top inclined at 30°. Exterior and interior finished white. Interior fitted with full width plastics covered shelf, two adjustable clear glass shelves and separate independently locked compartment in accordance with the Dangerous Drug Regulations. Three bayonet cap lampholders for use with 15W bulbs are fitted to provide for internal lighting and a red glass dome in the roof acts as a warning signal. All lamps are controlled by door operated switches. A 3-pole terminal block mounted inside the cupboard and a 19 mm entry hole are provided for connection to the electricity supply. Without 15W bulbs ... ... Each **£68·00** *mxN*

FY-957

FY-957

SAFETY SCREEN, 680 mm wide × 760 mm high, of transparent Technoplate, mounted in grey enamelled steel frame ... ... Each **£17·50** *mx*

PROTECTIVE CLOTHING see CP-705 et seq.
FIRE EXTINGUISHERS see FF-300 et seq.
For details see entries in List No. sequence.

TECHNOPLATE

TECHNOPLATE is a form of clear toughened glass capable of withstanding considerable impact and distributed heat. It is normally unaffected by alkalis, most organic materials and acids with the exception of hydrofluoric acid. To minimise the effect of the latter it can be obscured by etching. The main use of Technoplate is for safety screens and ends and sashes of fume cupboards.

Once manufactured, Technoplate cannot be cut or altered.

The maximum size of a single sheet is 1500 × 750 mm.

This material is supplied with the edges arrised unless otherwise stated.

FY-970

TECHNOPLATE, rectangular sheet, transparent, 6 mm thick... ... ... Price on application. *mxN*

FY-971

TECHNOPLATE, rectangular sheet, etched, 6 mm thick ... ... Price on application. *mxN*

OTHER BENCH TOP MATERIALS

Bench tops can be supplied to suit all purposes. Those in common use are listed. Tops may however be prepared from other materials, and we will gladly assist in selection.

TEAK. Moulmein, 20 mm thick, twice oiled. Exposed edges are rounded at the top and throated on the underside.

IROKO. 20 mm thick, twice oiled. Exposed edges are rounded at the top and throated on the underside.

FORMICA. On face and reverse side of fabricated timber core approximately 20 mm thick, lipped on exposed edges with teak. The standard colour finish is grey linette.

TILES. Acid resisting, mounted on Asbestolite.

STAINLESS STEEL. 18 gauge, FMB quality, mounted on a deal batten frame and turned down on edges.

PVC. 6 mm thick, set on 19 mm blockboard. Exposed edges are lipped with teak.

For details and prices see FX-430 to FX-435 in List No. sequence.

ASBESTOLITE

ASBESTOLITE is a compound of asbestos and cement. It has high tensile strength and is fire resisting and incombustible. In its natural state, Asbestolite is resistant to normal spillage of diluted acids and most organic solvents and when coated with a suitable solution will resist most acids and alkalis. It is extensively used for fume cupboard and combustion hood bases and backs, laboratory bench tops, glass blowing tables and purposes where protection against heat is required.

Asbestolite is available in two distinct grades. Grade A is suitable for evenly distributed temperatures only, up to 300°C—see FY-975 and FY-976. Grade B may be used in temperatures up to approx. 800°C—see FY-977.

FY-975

ASBESTOLITE SHEETS, Grade A, 2500 × 1200 mm, natural finish. For evenly distributed temperatures only, up to 300°C.

Thickness	3	4	6	10 mm	
Each	£13·00	14·00	18·00	22·50	*mxN*
Thickness	12	15	20	25 mm	
Each	£27·00	34·00	61·00	73·50	*mxN*

FY-976

ASBESTOLITE SHEETS, 2500 × 1200 mm, as FY-975 but anti-acid treated finish.

Thickness	3	4	6	10 mm	
Each	£17·50	18·50	23·00	27·50	*mxN*
Thickness	12	15	20	25 mm	
Each	£31·50	38·50	65·50	78·00	*mxN*

The standard size sheet is 2500 × 1200 mm but panels can be supplied cut to any size required, within the dimensions of the sheet. Rebating, cutting out of sink holes, small squares, disks or rings can be carried out to order. Where sheet sizes or bench tops are required longer than a standard sheet, these must be made up from more than one sheet. Thicknesses of 19 mm and 25 mm material can be supplied with rebated joints. Joints can be pointed with FX-840 cement.

FY-977

ASBESTOLITE SHEETS, Grade B, 2500 × 1200 mm, natural finish. May be used in temperatures up to approx. 800°C. For use where high or concentrated temperatures are present and suitable for use as palettes.

Thickness	6	8		10 mm	
Each	£31·50	39·00		45·50	*mxN*
Thickness	12	15	20	25 mm	
Each	£59·50	69·50	89·50	109·00	*mxN*

FX-840

CEMENT, for jointing Asbestolite piping and bench tops, fireclay and stoneware troughs and pipes, etc. For details and price see entry in List No. sequence.

GAS ANALYSIS

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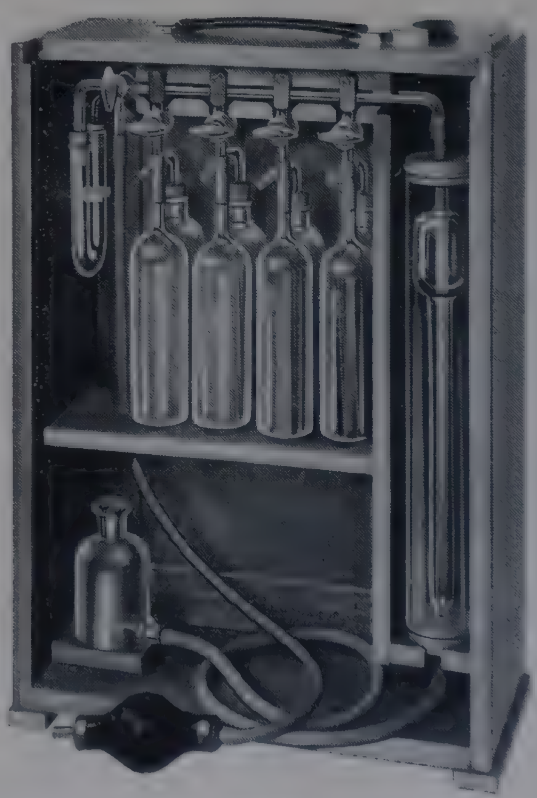
Gallenkamp ORSAT GAS ANALYSER

REGD TRADE MARK

BRITISH STANDARD PATTERN as described in BS 1756 Part 2
'Sampling and analysis of flue gases'

GC-020

GAS ANALYSER, Orsat, *Gallenkamp*, to BS 1756 Part 2, for the determination of CO, CO_2 and O_2 in flue gases, etc. With burette GC-030, two absorption vessels GC-040, and two absorption vessels GC-042, in portable polished wood case with removable front and back. Dimensions 53 × 37 × 16·5 cm ... ... Each **£54·00** *bx*



GC-020

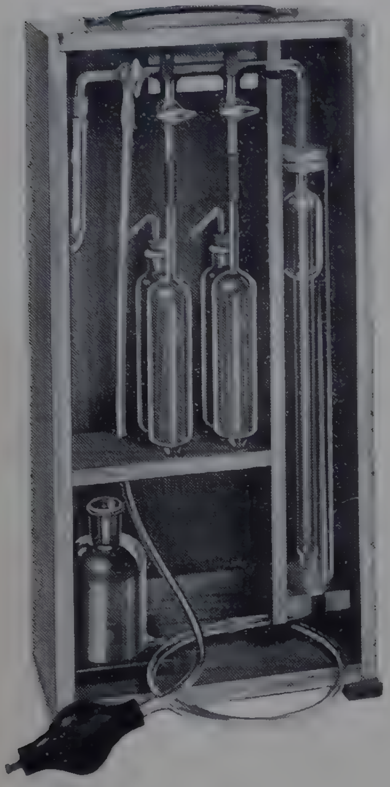
REPLACEMENT PARTS for GC-020 only

Please note that these parts are not suitable for use with Orsat analysers GC-100 to GC-120.

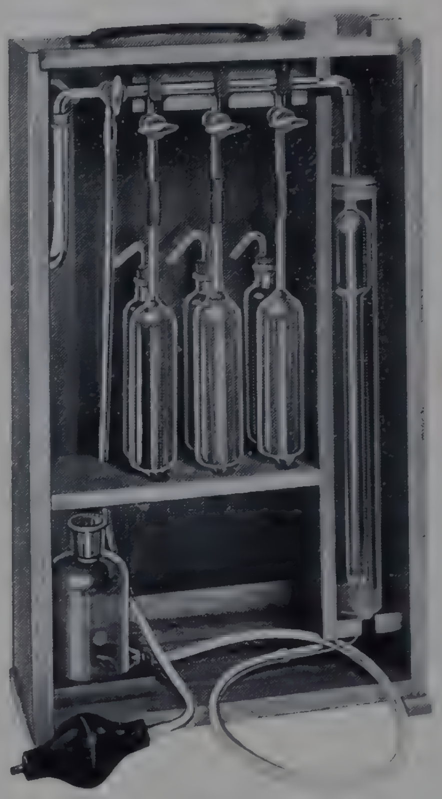
GC-030	**Burette,** *Technico*, Class A, capacity 100 cm³, with 70 cm³ in the bulb and 30 cm³ in the tube which is graduated in 0·2 cm³	Each	**£2·80**	*ax*
GC-034	**Burette jacket** for burettes GC-030 ...	Each	**£0·85**	*ax*
GC-040	**Absorption vessel,** filled with thin wall glass tubes.	Each	**£2·15**	*ax*
GC-042	**Absorption vessel,** as GC-040 but for use with cuprous chloride absorbent, each glass tube containing a spiral of copper wire	Each	**£4·10**	*ax*
GC-044	**Stopcock manifold,** with four side stopcocks, and T-bore end stopcock	Each	**£6·35**	*ax*
GC-046	**Levelling bottle**	Each	**£0·62**	*mx*

Gallenkamp ORSAT GAS ANALYSERS

REGD TRADE MARK



GC-100



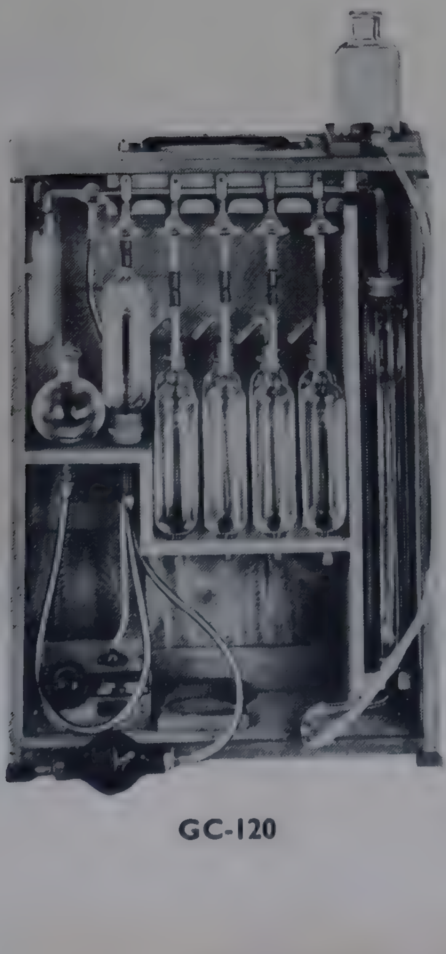
GC-110

GC-100

GAS ANALYSER, Orsat, *Gallenkamp*, for the determination of CO_2 and O_2 in flue gases, etc. With burette and two absorption vessels, GC-170 with filling tubes GC-171, in portable polished wood case with removable front and back. Dimensions 58 × 28 × 16·5 cm. **See Note below** ... ... Each **£46·00** *bx*

GC-110

GAS ANALYSER, Orsat, *Gallenkamp*, for the determination of CO_2 and O_2 and the approximate estimation of CO in flue gases, etc. With burette, three absorption vessels GC-170, 2 sets of filling tubes GC-171 and 1 set GC-173, in portable polished wood case with removable front and back. Dimensions 60 × 34 × 16·5 cm. **See Note below** ... ... Each **£50·00** *bx*



GC-120

GC-120

GAS ANALYSER, Orsat, *Gallenkamp*, for the determination of CO, CO_2, O_2 and H_2 in flue gases, etc. With four absorption vessels GC-170, with 2 sets of filling tubes GC-171 for CO_2 and O_2, and 2 sets GC-173 for CO, and a Harden type slow combustion pipette GC-178 for determination of H_2, CH_4, etc., in portable polished wood case with removable front and back. With rheostat and terminals for battery connection **but without battery.** Dimensions 60 × 43 × 16·5 cm. **See Note below.**

Each **£67·00** *bx*

ACCESSORY

CL-924 **Battery,** *Ever Ready* No. 126. For price see entry in List No. sequence.

NOTE: Apparatus GC-100 to GC-120 are normally supplied with burette GC-150 unless otherwise ordered. They can, on request, be supplied with any of the burettes GC-150, GC-152, GC-154 as listed on the next page. The absorption vessels for O_2 and CO_2 can also be replaced by the Shepherd type vessel with improved sintered glass distributor if required.

Gallenkamp ORSAT GAS ANALYSERS

COMPONENT PARTS AND ACCESSORIES

for apparatus GC-100, GC-110, GC-120

GC-150

BURETTE, *Technico,* capacity 100 cm³ of which 60 cm³ is contained in the bulb and 40 cm³ in the tube graduated in 0·2 cm³ ... ... Each **£2·00** *ax*

GC-151

BURETTE, *Technico,* as GC-150 but fitted with jacket GC-156 using rubber stoppers ... ... Each **£3·90** *ax*

GC-152

BURETTE, *Technico,* as GC-150 but with 75 cm³ in the bulb and 25 cm³ in the tube graduated in 0·2 cm³. Each **£2·15** *ax*

GC-153

BURETTE, *Technico,* as GC-152 but fitted with jacket GC-156 using rubber stoppers ... ... Each **£4·10** *ax*

GC-154

BURETTE, *Technico,* cylindrical, capacity 100 cm³. With tube graduated in 0·5 cm³ over whole length. Each **£2·00** *ax*

GC-155

BURETTE, *Technico,* as GC-154 but fitted with jacket GC-156 using rubber stoppers ... ... Each **£3·90** *ax*

GC-156

BURETTE JACKET, (AG), for burettes GC-150, GC-152 and GC-154 ... ... Each **£0·95** *ax*

GC-170

ABSORPTION VESSEL, (AG), accepts filling tubes GC-171 or GC-173. **Without filling tubes.** Each **£1·50** *ax*

GC-171

FILLING TUBES, (AG), thin wall glass in a pack sufficient to fill one absorption vessel GC-170 ... Pack **£0·45** *ax*

GC-173

FILLING TUBES, (AG), thin wall glass with internal copper wire spiral for use with cuprous chloride absorbent. Pack sufficient to fill one absorption vessel GC-170. Pack **£1·70** *ax*

GC-176

ABSORPTION VESSEL, (AG), **Shepherd bubbling type,** with sintered glass distributor, for rapid and efficient absorption ... ... Each **£5·80** *ax*

GC-178

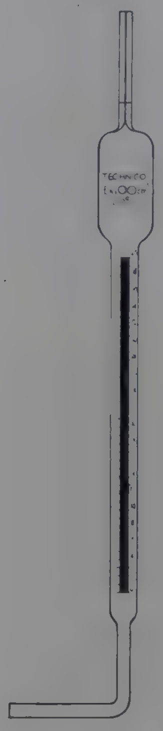
GAS PIPETTE, (AG), **Harden slow combustion,** as fitted to GC-120, comprising stout vessel with rubber stopper holding both the platinum wire element with its leads, and glass tube for levelling bulb connection. Each **£3·70** *ax*

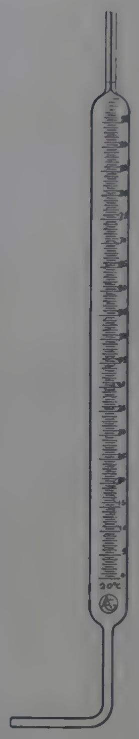
GC-180

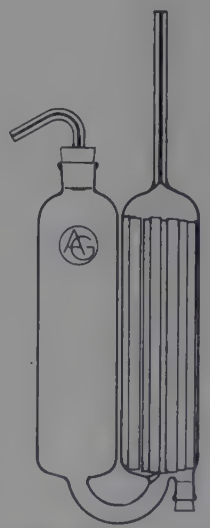
STOPCOCK MANIFOLD, (AG), for GC-100, with two side stopcocks and one T-bore end stopcock. Each **£5·15** *ax*

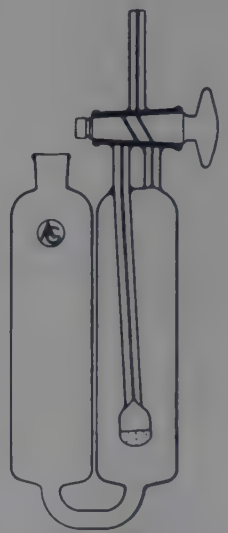
GC-182

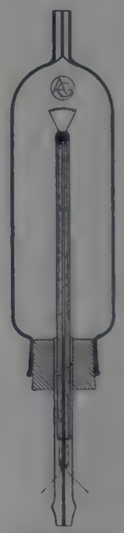
STOPCOCK MANIFOLD, (AG), as GC-180 but for GC-110, with three side stopcocks ... Each **£5·55** *ax*

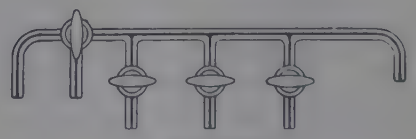

GC-150


GC-154


GC-170 with GC-171


GC-176


GC-178


GC-182

GC-184

STOPCOCK MANIFOLD, (AG), as GC-180 but for GC-120, with five side stopcocks ... Each **£7·85** *ax*

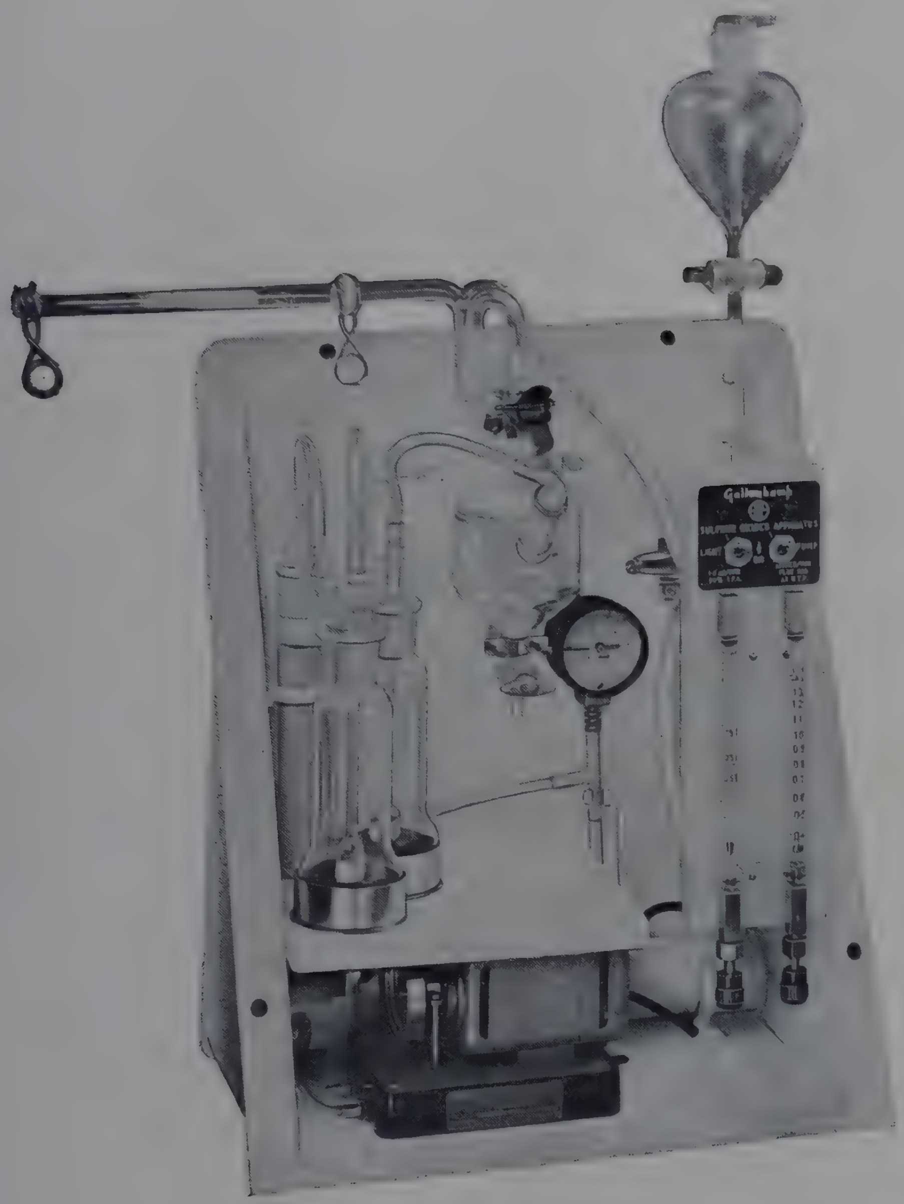
AU-340	**Levelling bottle,** 250 ml ...	For details and prices see entries in List No. sequence.
MF-920	**Mercury reservoir,** 150 ml for GC-120	
MF-932	**Mercury,** triple distilled ...	
RV-030	**PVC bellows**	

Gallenkamp — C.E.R.L. SULPHUR OXIDES ANALYSER

REGD TRADE MARK

TO BS 1756 Part 4

For determinations of sulphur dioxide and sulphur trioxide in flue gases



GC-220

Developed in collaboration with the Central Electricity Research Laboratories, Leatherhead, Surrey.

References

Fielder, Jackson and Raask, J. Inst. Fuel, 1960, **33**, No. 229, 85.
Fielder and Morgan, Anal. Chim. Acta., 1960, **23**, 538.

GC-220

SULPHUR OXIDES APPARATUS, *Gallenkamp-C.E.R.L.*, with pump, rheostat, needle valves, pressure gauge, thermometer, all glass parts and flowmeters mounted on illuminated panel. Contained in fibreglass carrying case. With 1·5 metre stainless steel probe and one charge of *Soxazorb*. **Without heating tape, reagents or titration equipment.** For 220/240V a.c. single phase supplies ... ... Each **£199·00** *gx*

Also available for 200/210V and 110/120V a.c. supplies to special order.

When ordering please state voltage and frequency of supply.

ACCESSORIES

HE-150	**Heating tape,** 125 cm long, 13 mm wide. Approximate loading 72W. Supplied with lead-in wire and connector; **three required for 1·5 metre probe.** For price see entry in List No. sequence.
BT-215	**Bottle, polypropylene,** wide mouth, capacity 125 ml, suitable for receiving isopropanol from absorber for titration. For details and price see entry in List No. sequence.
AR-505	**Asbestos tape,** 25 × 1·5 mm. For details and price see entry in List No. sequence.

REPLACEMENT PARTS

GC-226	**'Soxazorb',** to absorb sulphur dioxide. Made to C.E.R.L. specification	Per kg **£6·40** *mx*
GR-160	**Quartz wool**	For prices see entries in List No. sequence.
TJ-380	**Thermometer,** water jacket, scale span 10 to 40°C...	

METHOD

Flue gas is aspirated through the apparatus by means of a diaphragm pump which is fitted with a vacuum gauge and a rheostat in the motor circuit to control the pump speed. The rate of flow of gas is controlled by a needle valve and is measured by a flowmeter calibrated 0·5 to 1·3 litres/min.

The gas is sampled through a stainless steel probe which may be heated by accessory heating tapes. After passing through a filter to remove dust, the gas is mixed with a stream of isopropanol which is controlled by a needle valve and is measured by a flowmeter. The combined flow then proceeds to a filter which separates off the isopropanol and sulphur trioxide for titration at the end of the sampling period. The remaining gas passes into an iodine solution for colorimetric estimation of sulphur dioxide. The final gas is washed and passed through a *Soxazorb* absorber before being pumped out of the apparatus.

SULPHUR CONTENT

of steels, coal and petroleum products

High temperature combustion can be carried out using:

FS-300 Horizontal tube furnace, *Gallenkamp*, **maximum temperature 1400°C.**

For full details see entry in List No. sequence.

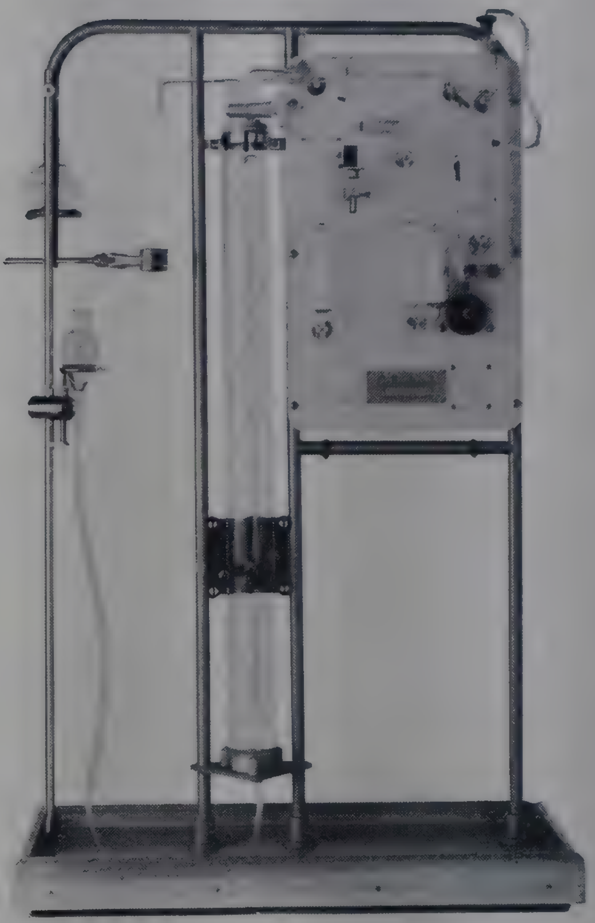
Gallenkamp HALDANE GAS ANALYSERS

REGD. TRADE MARK

GC-300

GAS ANALYSER, Haldane, *Gallenkamp*, laboratory model, to BS 1756 Part 3, for the determination of O_2, CO_2, CO, H_2, and CH_4. All glass parts are retained by metal clips on a white plastics panel mounted on a tubular steel framework which is supported by a mercury tray. A control rheostat and mains transformer are also mounted on the panel. The burette jacket is fitted with a movable illuminated screen and reader. Screw operated adjustment to 0·05 mm is provided for the reservoirs which control the levels in the burette and potash pipette. Requires approx. 1·3 kg mercury excluding sampling tube assembly. For 200/250V 50 Hz a.c. single phase supplies. Complete with a copy of British Standard 1756 Part 3 which describes the use of the analyser but **without mercury or reagents** ... ... Each **£221·00** *bx*

In the U.K. this apparatus is supplied packed in a metal frame charged at £5 which is refunded on return in good condition.



GC-300

ACCESSORIES

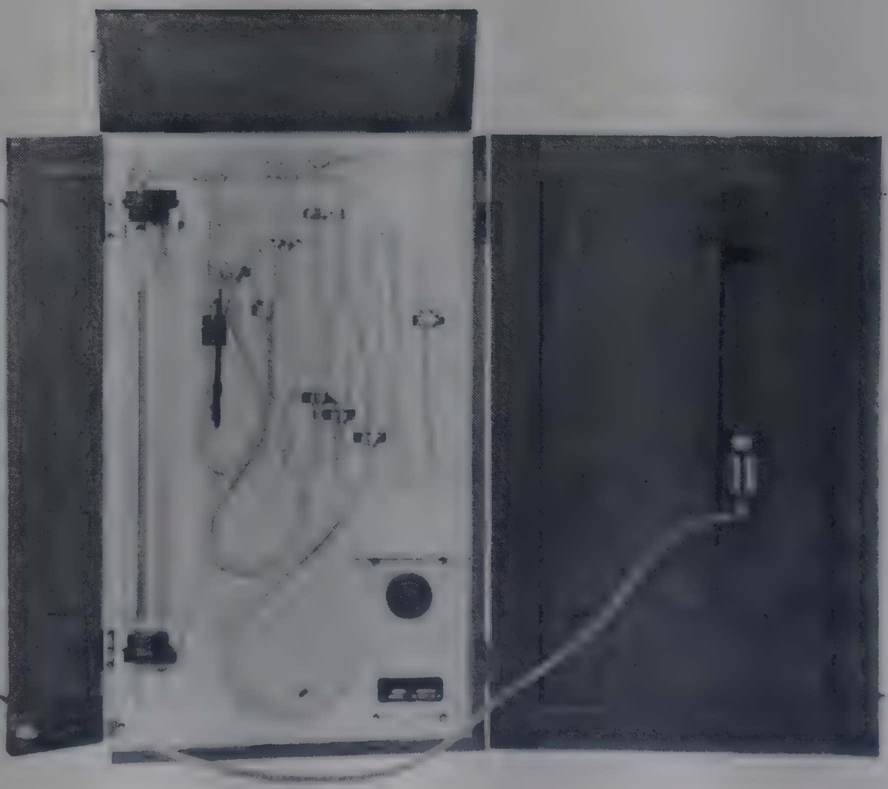
GF-405	**Gas sampling tubes**	For details and prices see entries in List No. sequence.
MF-932	**Mercury, triple distilled** ...	

REPLACEMENT PARTS

GC-310	**Burette,** *Technico*, Class A, graduated 15 to 21 cm^3 in 0·01 cm^3 with 2·5 cm^3 mark on the bulb.	Each	**£18·50**	*ax*
GC-312	**Compensating bulb,** capacity 20 ml ...	Each	**£1·45**	*ax*
GC-314	**Water jacket,** for burette GC-310 ...	Each	**£3·40**	*ax*
GC-315	**Mercury reservoir,** 100 ml	Each	**£0·55**	*ax*
GC-316	**Absorption vessel,** for absorbing CO_2 in KOH, packed with glass tubes	Each	**£3·35**	*ax*
GC-318	**Absorption vessel,** for absorbing O_2 in pyrogallol, packed with glass tubes	Each	**£5·00**	*ax*
GC-321	**Combustion pipette,** with Pt element for combustion of H_2 and CH_4	Each	**£11·50**	*ax*
MF-920	**Mercury reservoir,** 250 ml, for sample introduction For price see entry in List No. sequence.			
GC-322	**Potash reservoir**	Each	**£1·00**	*ax*
GC-325	**Connecting piece** with stopcock.	Each	**£2·95**	*ax*
GC-326	**Connecting piece,** between burette, absorption vessels and combination pipette, with two oblique bore stopcocks.	Each	**£4·35**	*ax*

GC-350

GAS ANALYSER, Haldane, *Gallenkamp*, a portable modified version of GC-300. Comprising 10 cm^3 burette with 3 cm^3 in graduated portion, and compensating vessel in water jacket, with combustion vessel, two absorption vessels, three mercury reservoirs and a guard tube. Requires approx. 1 kg mercury. With rheostat and filling tubes, in portable polished wood case, dimensions 56×38×9 cm. **Without mercury, reagents or battery** ... ... Each **£97·50** *bx*



GC-350

ACCESSORY

CL-924	**Battery,** *Ever Ready* No. 126. For price see entry in List No. sequence.

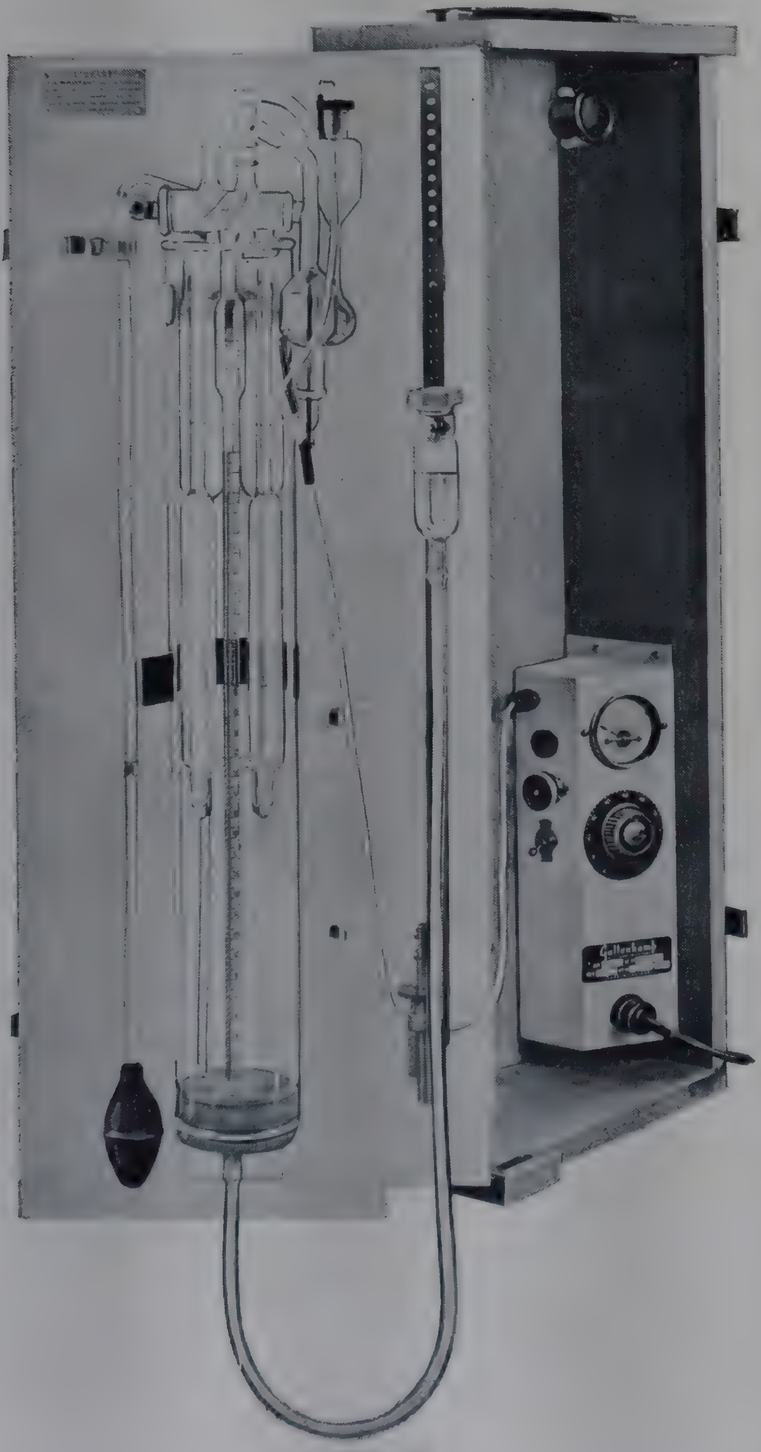
Gallenkamp LLOYD GAS ANALYSER

(Patented)

For high accuracy determinations of O_2, CO_2, CO, CH_4, H_2 and other gases such as C_2H_2

APPLICATIONS

- **Research and applied physiology**
- **Respiratory gas analysis**
- **Mine air analysis**
- **Flue gas analysis**
- **Fuel gas analysis**
- **Teaching of laws of chemical combination**
- **Analysis of standard gas mixtures for calibration of automatic analysers**
- **Calibration of blood gas electrodes**



GC-412

- **Rapid - complete O_2/CO_2 analysis in 6 minutes**
- **Suitable for BS 1756 'Sampling and analysis of flue gases'**
- **Accurate to 0·02% total volume**
- **Single stopcock operation**
- **Leak-free construction**
- **Temperature and pressure compensated**
- **Fully portable—easily cleaned and recharged**
- **Simple levelling**
- **Detailed instructions manual supplied**

The Lloyd Gas Analyser is at least as accurate as traditional absorption apparatus and incorporates the following improvements:

Burette. The gas burette is calibrated from 7 to 10·1 cm³ in 0·01 cm³ by ring and half-ring graduations.

Single stopcock. A complete CO_2, O_2 determination may be carried out with four movements of a single large-surface stopcock. This stopcock also permits rapid washing-in of successive samples for analysis without spillage of mercury.

Leakage. The whole main working assembly is composed of a single blown glass structure without joints; leakage is therefore impossible.

Temperature and pressure compensation. The main glass part is totally immersed in a single water-jacket to keep it at a uniform temperature. A fixed mass of air is enclosed above the reagents in the reservoirs, and all readings are made with this mass of gas at constant volume. Corrections for sudden or long-term changes in ambient temperature and pressure are, therefore, not required.

Portable design. Even when charged with reagents, the analyser is convenient and safe to carry or transport.

Rapid analyses. As a result of the proximity of the reservoirs to the burette, dead space is reduced to a minimum and absorption is rapid and efficient.

Cleaning. In the event of a manipulative error, washing out of displaced reagents and, if necessary, cleaning and refilling are simple and rapid.

Levelling. This was a major drawback of the Haldane gas analysis apparatus, which involved *simultaneous* manipulation of two reservoirs, and the *simultaneous* observation of *two* meniscuses. In the Lloyd apparatus *only one* reservoir has to be moved and *only one* meniscus watched.

High concentration components:

The Lloyd Gas Analyser directly measures sample components up to 30% of total gas volume. For higher concentrations, gas samples may easily be diluted with inert gas *prepared from air.*

REFERENCES

(1) Haldane, J. S. and Graham, J. I. (1935). 'Methods of air analysis' 4th ed. London: Griffin.

(2) Lloyd, B. B. (1958). 'Development of Haldane's Gas Analysis Apparatus.' J. Physiol., **143**, 5-6 p.

(3) Lloyd, B. B. (1960). British Patent Specification No. 844905 'Gas Analysis Apparatus.'

(4) Hill, D. W. (1963). 'Bull. Inst. Phys.', **14**, 2.

(5) Durnin and Passmore. 'Energy, Work and Leisure', pp. 19-20. (1967). Pub. Heinemann, London.

(6) Cormack, R. S. (1972). 'Eliminating two sources of error in the Lloyd-Haldane Apparatus'. Resp., Physiol., **14**, 382.

Gallenkamp LLOYD GAS ANALYSER

(continued)

ACCESSORIES

The Lloyd Gas Analyser is supplied either with or without accessory pipettes, depending upon whether or not combustible or other gases are to be analysed in addition to oxygen and carbon dioxide. All pipettes are supplied with interchangeable ground sockets to fit the cones on the outlet tube of the main burette assembly.

The single and double absorption pipettes (GC-442 and GC-444) are for analyses in which absorbents in addition to KOH and pyrogallol are required for component gases such as carbon monoxide and unsaturated hydrocarbons.

The combustion pipette (GC-452) is for analyses of gas mixtures containing combustible components such as CO, H_2 and CH_4. Rapid combustion is effected by the carefully constructed and positioned detachable platinum filament which is electrically heated via a mercury switch. A step-down mains transformer is built in to the control box but, in the absence of a mains supply an external battery may be used. In this case a battery of 4·5V to deliver 2A is required. Filament temperature is controlled by a built-in ammeter and rheostat, so that low and high temperature combustion components may be determined separately.

The combined combustion/absorption pipette (GC-454) is for analyses where some gases other than O_2 and CO_2 are to be determined by absorption and others by combustion. It is particularly applicable to estimation of unsaturated hydrocarbons in fuel gas analysis.

The analyser is contained in a case (with carrying handle) which acts as a stand in use. Also supplied are a sample transfer tube, a small tubular reservoir for the outlet, a magnifier-reader and a polythene cannula for the addition and removal of reagents.

Detailed operating procedure is carefully explained in the instructions manual supplied.

Gallenkamp hold the exclusive licence to manufacture and sell, as well as use the name Lloyd in connection with the Lloyd Gas Analyser, The apparatus is covered by the following patents: Great Britain 844,905. U.S.A. 2972523, Canada 629500, Japan 283681.

GC-400

GAS ANALYSER, Lloyd, *Gallenkamp*, as specification, for O_2 and CO_2 determinations. Complete in carrying case, but **without mercury or reagents.** Requires approximately 350 g mercury. Overall dimensions 70 × 25 × 16 cm, weight 7 kg ... ... Each **£112·50** *bx*

GC-402

GAS ANALYSER, Lloyd, *Gallenkamp*, as GC-400 but including GC-442 **single** absorption pipette. Each **£129·00** *bx*

GC-404

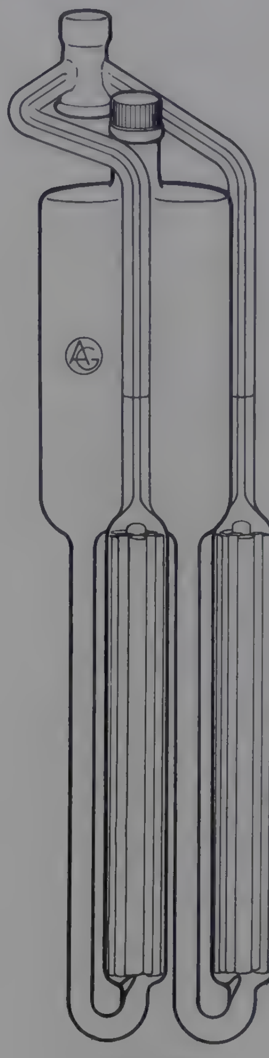
GAS ANALYSER, Lloyd, *Gallenkamp*, as GC-400 but including GC-444 **double** absorption pipette. Each **£136·00** *bx*

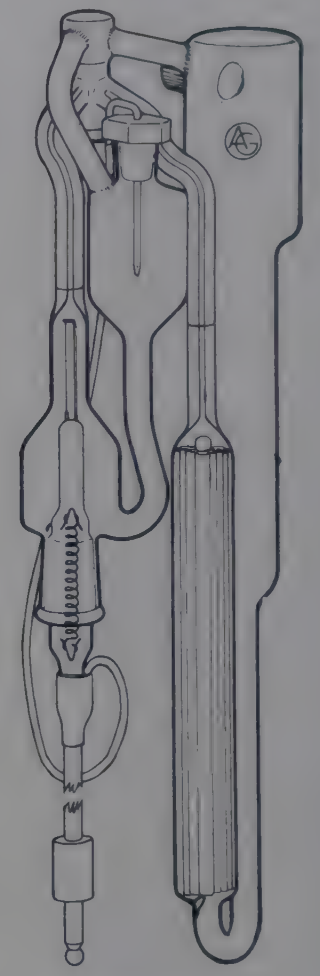
GC-412

GAS ANALYSER, Lloyd, *Gallenkamp*, as GC-400 but including GC-452 combustion pipette and electrical controls. Requires approximately 500 g mercury. Each **£157·00** *bx*

GC-414

GAS ANALYSER, Lloyd, *Gallenkamp*, as GC-412 but with GC-454 combined combustion/absorption pipette in place of combustion pipette ... ... Each **£201·00** *bx*


GC-444

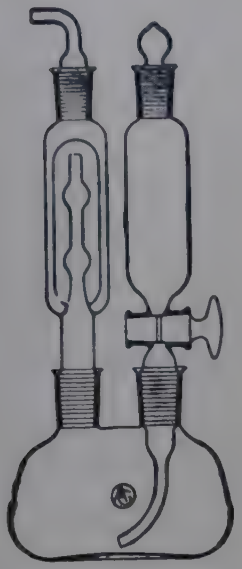

GC-454

REPLACEMENT PARTS

GC-430	**Burette assembly,** comprising a borosilicate glass burette with 5-way stopcock and absorption vessels in one unit, assembled complete with rubber stopper in water jacket	Each	**£44·50**	*ax*
GC-442	**Absorption pipette, single**	Each	**£16·50**	*ax*
GC-444	**Absorption pipette, double**	Each	**£23·50**	*ax*
GC-452	**Combustion pipette,** with filament assembly GC-460.	Each	**£14·00**	*ax*
GC-454	**Combustion/absorption pipette,** with ground socket and filament assembly GC-460	Each	**£44·00**	*ax*
GC-460	**Filament assembly,** with ground cone mounting, for GC-452 or GC-454 (also GC-412 and GC-414).	Each	**£4·80**	*ax*
MA-660	**Magnifier.** For price see entry in List No. sequence.			

ACCESSORIES

GF-405	**Gas sampling tubes**		For prices see entries in List No. sequence.
LX-220	**Lubricant** ...	alternative lubricants for 5-way stopcock...	
VB-882	**Apiezon grease**		
MF-932	**Mercury,** triple distilled		
SY-410	**Syringe,** all glass, 20 ml, for introducing reagents into analyser		



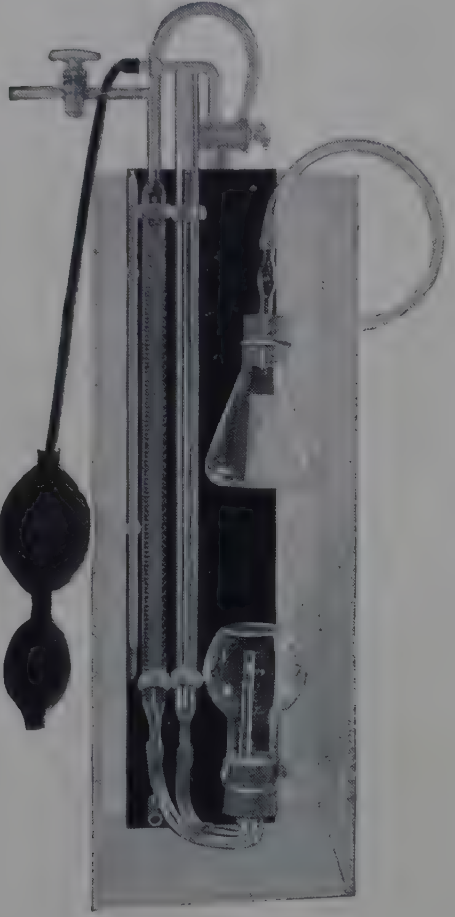
GC-940

GC-940

ALKALIMETER, Schroedter, borosilicate glass, for the determination of the carbonic acid in limestone, etc. Comprises one each components GC-942 to SU-520 listed below ... ... Ten **£48·00** Each **£5·50** *ax*

COMPONENTS

GC-942	**Reaction vessel** with 12/14 sockets ...		Each £2·10	*ax*
GC-944	**Absorption tube** with 12/14 cone and 10/13 socket.		Each £1·50	*ax*
GC-946	**Tap funnel** with 12/14 cone and 10/13 socket.		Each £1·70	*ax*
GC-948	**Open stopper** with 10/13 cone.	Ten £5·30	Each £0·59	*ax*
SU-520	**Closed stopper** with 10/13 cone. For price see entry in List No. sequence.			



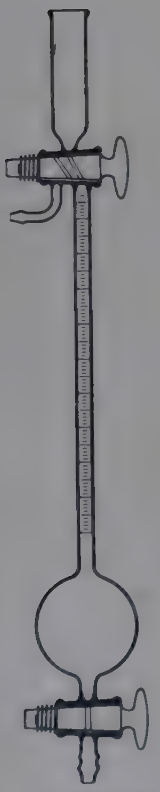
GC-960

GC-960

CALCIMETER, Collins, for an accurate determination of carbon dioxide in carbonates and carbonic acid in soils, cements, limestones, etc. Supplied with instructions manual ... ... Each **£17·85** *fx*

REPLACEMENT COMPONENT AND ACCESSORY

GC-961	**Flask,** 150 ml	Each £0·30	*mx*
GC-962	**Calculating slide rule**	Each £4·15	*mx*



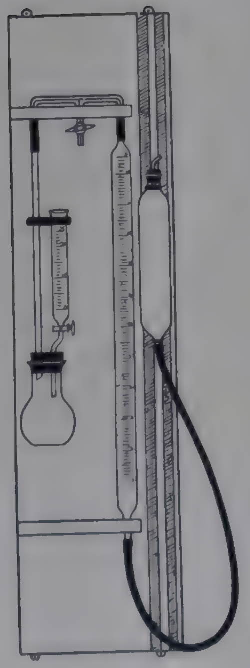
GC-970

GC-970

CARBON DIOXIDE GAS BURETTE, *Technico,* **Martin.** For the estimation of carbon dioxide in worts, beers, etc. The burette permits estimation in less than ten minutes without the need for calculations involving pressure, temperature, etc. (Reference: Journal of the Institute of Brewing, February 1936, p. 79.) **Without stand or accessories** ... ... Each **£11·30** *ax*

ACCESSORIES

FP-581	**Separating funnel,** 500 ml	For prices see entries in List No. sequence.
MF-920	**Levelling reservoir,** 250 ml	



GC-980

GC-980

CHITTICK APPARATUS, *Gallenkamp,* for the determination of percentage carbon dioxide in baking powders and chemicals. Comprises a wall-mounting wooden board fitted with acid burette, decomposition flask, capillary manifold, gas burette, and levelling reservoir. Supplied with table for correcting the volume reading for temperature and pressure to give % carbon dioxide by weight. (Reference: A.O.A.C. Official Methods of Analysis.) Each **£25·00** *bx*

REPLACEMENT PARTS

GC-982	**Gas burette,** graduated —25 to +200 cm^3 in 1 cm^3.	Each £1·80	*ax*
GC-984	**Acid burette,** graduated 0 to 25 cm^3 in 1 cm^3.	Each £1·75	*ax*
GC-986	**Levelling bulb,** capacity 300 ml ...	Each £1·35	*ax*
GC-988	**Capillary manifold,** with stopcock ...	Each £1·20	*ax*
FJ-100	**Flask,** 250 ml. For price see entry in List No. sequence.		

CARBON DIOXIDE INCUBATION

Gallenkamp manufacture continuous flow

CO_2/AIR INCUBATORS, range 0 to 45°C for use in the growth of cell, tissue and organ cultures and bacteria.

Also available

CO_2/AIR BLENDER, for the measurement and control of atmosphere supply.

For details see IH-295 to IH-345 in List No. sequence.

GD-020

GAS BURETTE, *Technico,* **Hempel,** with straight bore stopcock at top and two-way stopcock at bottom. Capacity 100 cm³ graduated in 0·2 cm³, with levelling tube but **without rubber tubing** ... ... Pair **£7·05** *ax*

GD-050

GAS BURETTE, *Technico,* **Tutweiler,** for the determination of H_2S in gas samples. Upper cylinder graduated 0–10 cm³ in 0·1 cm³ and with two marks on main bulb at 100 and 110 cm³ ... ... Each **£7·35** *ax*

GD-205

EUDIOMETER, *Technico,* **Bunsen,** capacity 50 cm³ graduated in 0·1 cm³. With sealed-in electrodes at the closed end ... ... Each **£2·75** *ax*

GD-240

BEEHIVE SHELF, earthenware. Diameter 7·5 cm.
Ten **£2·40** Each **£0·30** *cx*

GD-245

PNEUMATIC TROUGHS, glass, circular, for collection of gases over water or for storage of specimens.

Diameter	15	20	25	30	35 cm	
Height	10	10	12	12	15 cm	
Ten	**£11·10**	**14·20**	—	—	—	*mx*
Each	**£ 1·25**	**1·60**	**2·20**	**2·76**	**4·42**	

GD-250

GAS JARS, glass, with ground flange.

Height	15	20	25	30 cm	
Int. dia.	5	5	5	7·5 cm	
Ten	**£4·30**	**4·80**	**5·70**	**9·40**	*cx*
Each	**£0·48**	**0·53**	**0·64**	**1·04**	

GD-265

COVERS, glass, flat and ground on one side, for GD-250. In packs of 10.

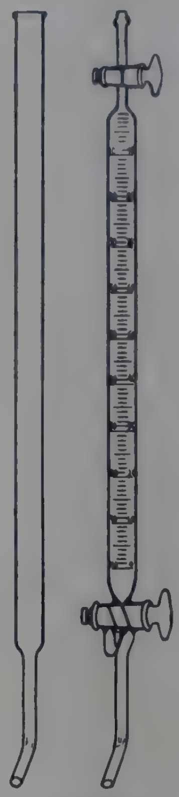
Diameter of cover	7·5	10·5 cm	
Diameter of gas jar	5	7·5 cm	
10 packs	**£6·80**	**7·80**	*cx*
Pack	**£0·76**	**0·86**	

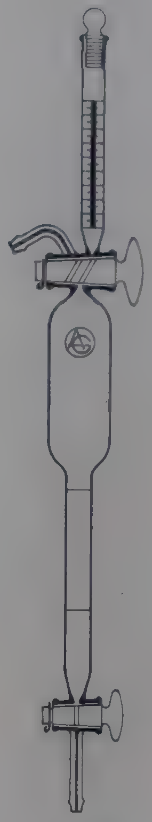
GD-300

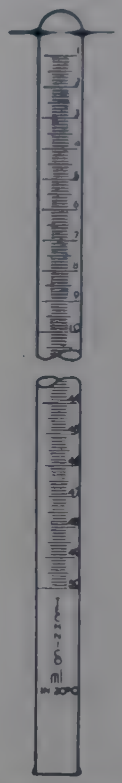
DEFLAGRATING SPOON, for burning sulphur, with brass shield ... ... Ten **£2·20** Each **£0·29** *cx*

GD-320

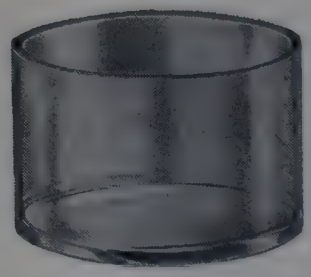
SPLINTS, wood, for igniting and testing gases, in bundles of 1000 ... 10 bundles **£3·50** Bundle **£0·59** *cx*


GD-020

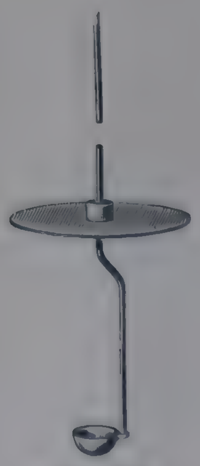

GD-050


GD-205

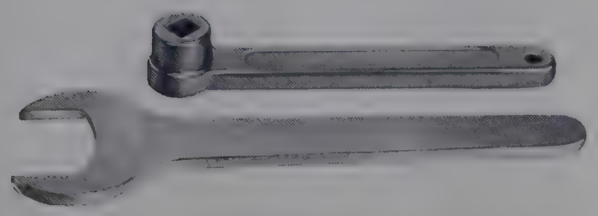
GD-240


GD-245

GD-250


GD-300

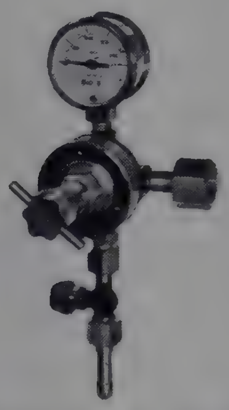
GAS CYLINDERS AND ACCESSORIES



GD-421

PRESSURE AND FLOW REGULATORS IMPORTANT NOTES

1. Pressure regulators are designed to give reasonably steady outlet pressures over a range of flow rates; flow regulators are designed to give reasonably constant flow against fluctuations in back pressure.
2. It is not good practice to include needle valves downstream of components (e.g. flowmeters and low pressure gauges) not intended for high pressure operations unless a safety valve is fitted. Otherwise, with the needle valve screwed shut, leakage past the high pressure valve could slowly cause a sufficient build up of pressure to cause the low pressure component to explode.



GD-510 with GD-536
GD-520 with GD-536

GD-530
GD-531

FILLED GAS CYLINDERS

GAS CYLINDERS, steel, colour coded to BS 349 according to gas content, 12·5 cm dia., **filled with gas (not suitable for inhaling).** GD-401 has outlet thread 0·860×14 TPI BSW. GD-402 to GD-407 have outlets threaded ⅝ in BSP.

List No.	Contents	Each	
		£	
GD-401	28 lb carbon dioxide	**38·00**	*mxN*
GD-402	40 ft^3 air	**25·00**	*mxN*
GD-403	40 ft^3 nitrogen	**25·00**	*mxN*
GD-404	40 ft^3 hydrogen	**25·00**	*mxN*
GD-405	48 ft^3 oxygen	**25·00**	*mxN*
GD-406	48 ft^3 argon	**30·00**	*mxN*
GD-407	44 ft^3 helium	**46·00**	*mxN*

Quotation on application for gases not listed above.

GD-421

TOOL SET, comprising spanner for cylinder gland nuts and key to fit cylinder valve ... ... Each **£1·05** *mx*

PRESSURE REGULATORS

GD-510

PRESSURE REGULATOR for carbon dioxide only, threaded 0·860×14 TPI BSW to BS 341 Part I Outlet 8, with 55 mm diaphragm. This regulator connects direct to a carbon dioxide cylinder and has a cylinder contents gauge with dual scale reading to 150 kgf/cm^2 and 2300 lbf/in^2. The outlet pressure is adjustable from 0 to 8 kgf/cm^2 (0 to 120 lbf/in^2) and is indicated by the position of the adjusting screw. With safety valve in low pressure side and outlet nozzle for 6·5 mm bore flexible tubing. Each **£14·70** *mx*

GD-520

PRESSURE REGULATOR, single stage, for oxygen, air, nitrogen and argon, threaded ⅝ in BSP right hand to BS 341 Part I Outlet 3. With cylinder contents gauge dual scaled 0 to 280 kgf/cm^2 and 0 to 4000 lbf/in^2. The outlet pressure is adjustable from 0 to 8 kgf/cm^2 (0 to 120 lbf/in^2) and is indicated by the position of the adjusting screw. With outlet nozzle for 6·5 mm bore flexible tubing ... ... Each **£7·50** *mx*

GD-530

PRESSURE REGULATOR, two stage, for oxygen, air, nitrogen and argon, threaded ⅝ in BSP right hand to BS 341 Part I Outlet 3. With contents gauge dual scaled 0 to 280 kgf/cm^2 and 0 to 4000 lbf/in^2 and outlet pressure gauge dual scaled 0 to 2 kgf/cm^2 and 0 to 30 lbf/in^2. With outlet nozzle for 6·5 mm bore flexible tubing ... ... Each **£19·00** *mx*

GD-531

PRESSURE REGULATOR for hydrogen, propane and coal gas, as GD-530 but threaded ⅝ in BSP left hand to BS 341 Part I Outlet 4 Each **£21·70** *mx*

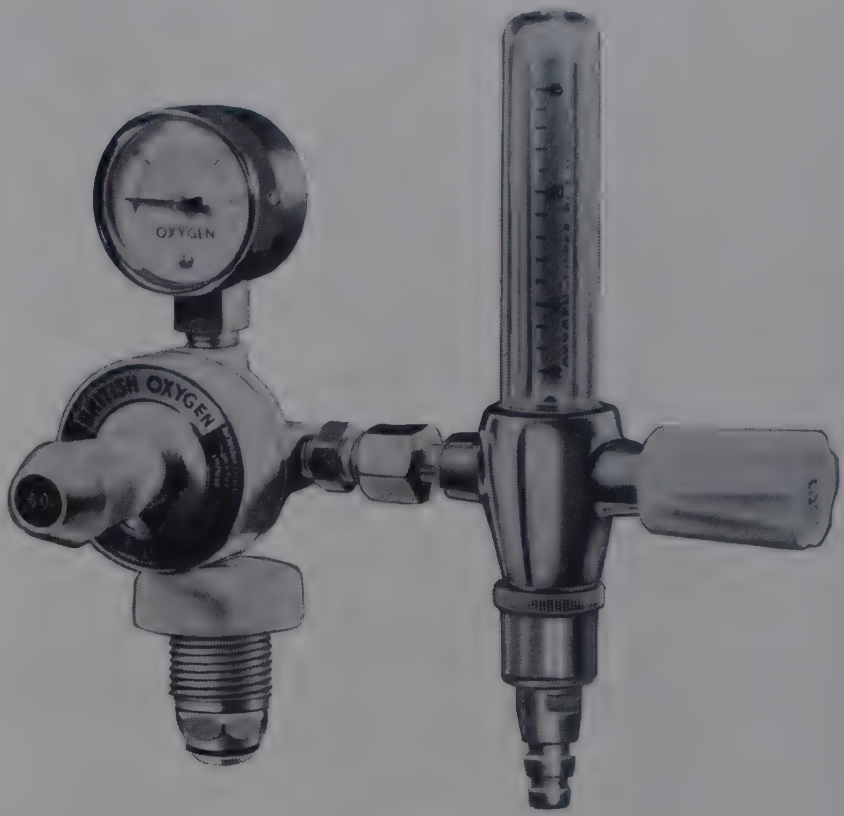
ACCESSORIES

GD-536	**Needle valve,** right hand thread, for fine adjustment of gas flow, to be inserted between regulator and outlet nozzle. For use with GD-510, GD-520 or GD-530. Each	**£2·40** *mx*
GD-538	**Needle valve,** as GD-536 but with left hand thread. For use with GD-531 ... ... Each	**£2·40** *mx*

FLOW REGULATORS

GD-557

FLOW REGULATOR, for oxygen, threaded $\frac{5}{8}$ in BSP right hand to BS 341 Part 1 Outlet 3, complete with flowmeter calibrated 2 to 15 litres/min of oxygen. Flowmeter readings must be corrected when using gases other than oxygen. A fine adjustment valve provides accurate smooth control of flow rates. With cylinder contents gauge calibrated 0 to 4000 lbf/in^2 and 0 to 280 kgf/cm^2, pressure regulator locked and preset at a nominal 4·2 kgf/cm^2, safety valve and a tapered nozzle suitable for flexible tubing up to 9 mm bore. Can also be used with air, nitrogen and argon ... Each **£27·50** *mx*



GD-557

PROPANE REGULATOR

GD-531

REGULATOR, suitable for use on propane cylinders. For price see entry in List No. sequence.

CYLINDERS, TROLLEYS AND STANDS

The following table shows the capacities and diameters of commonly used gas cylinders, together with suitable trolley size.

Dia. in	Capacity				Trolley size No.
	O_2	N_2O	CO_2	H_2, N_2 & Air	
5	—	—	14 lb	—	2
5$\frac{1}{2}$	48 ft^3	800 gal	28 lb	40 ft^3	2
7	120 ft^3	2000 gal	—	110 ft^3	3
8	180 ft^3	—	40 lb	165 ft^3	4
9	240 ft^3	—	—	—	5

FLEXIBLE TUBINGS

TX-625 **Rubber, thick wall, reinforced with canvas.**

TX-778 **PVC with terylene mesh reinforced wall.**

For details and prices see entries in List No. sequence.

GD-602

CYLINDER TROLLEYS, constructed in heavy gauge steel. Laboratory quality finish in stoved enamel. With cylinder retaining strips and rubber tyred anti-static wheels.

Size No.	2	3	4	5	
For cylinders max. dia.	5$\frac{3}{4}$	7	8	9 in	
Each	**£24·00**	**25·50**	**26·00**	**26·50**	*cx*

GD-620

CYLINDER STAND, strongly constructed in steel, nylon coated to take cylinders up to 5$\frac{3}{4}$ in dia. Each **£8·30** *cx*

GD-625

CYLINDER STAND, as GD-620 but to take cylinders up to 7 in dia. ... ... Each **£8·50** *cx*

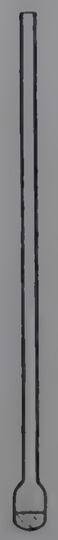
GD-602

GD-620
GD-625

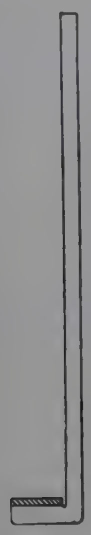
SINTAGLASS GAS DISTRIBUTION TUBES

- Close tolerance porosity ranges
- Made from borosilicate glass

For full details of porosity ranges and other useful information see data under page heading Sintered Glassware.



GD-800 to GD-802



GD-820 to GD-834

GAS DISTRIBUTION TUBES, *SintAGlass*, with **domed** sintered glass bulb having an effective area equivalent to a flat plate of 20 mm diameter. Gives better absorption than a tube with a flat plate. Can be inserted through a 19/26 socket. Stem length 300 mm.

GD-800	Porosity 0.	Ten	**£6·60**	Each	**£0·74**	*ax*
GD-801	Porosity 1.	Ten	**£6·60**	Each	**£0·74**	*ax*
GD-802	Porosity 2.	Ten	**£6·60**	Each	**£0·74**	*ax*

ACCESSORIES

TJ-325 **Adapter,** with 19/26 cone, for fitting above tubes into apparatus with 19/26 sockets. See entry in List No. sequence.

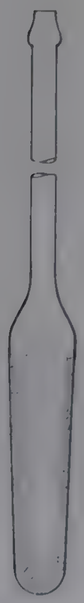
Note: A short length of rubber or plastics tubing of 6 mm bore is required to effect a seal between the tube and the adapter.

Minimum gas pressure drop across plate (approx.) necessary to force gas through wet plates GD-800 to GD-834.

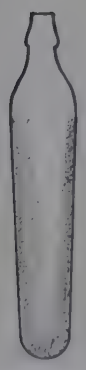
Porosity	Pressure, torr
0	8
1	15
2	25
3	55
4	180

GAS DISTRIBUTION TUBES, *SintAGlass*, with **flat** sintered glass plate. Stem length 150 mm.

Plate diameter	15	20 mm	
Porosity	List Numbers		
0	**GD-820**	**GD-830**	
1	**GD-821**	**GD-831**	
2	**GD-822**	**GD-832**	
3	—	**GD-833**	
4	—	**GD-834**	
Ten	**£10·00**	**8·40**	*ax*
Each	**£ 1·12**	**0·94**	



GD-841
GD-843



GD-851
GD-853

GAS DISTRIBUTION TUBES, *SintAGlass*, **thimble form**, with sintered glass thimble, size 22 × 80 mm, providing a large surface area for rapid flow rates. Suitable also for use as immersion filters for removing large volumes of supernatant liquid from solid sediment. Available with short nipple connection or long suction tube. In two porosities:

Coarse	approx. equivalent to porosity 1.
Fine	approx. equivalent to porosity 3.

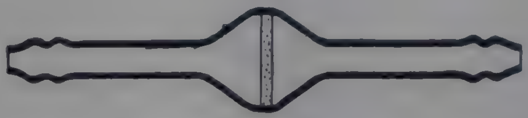
Stem length	300	30 mm	
Porosity	List Numbers		
Coarse	**GD-841**	**GD-851**	
Fine	**GD-843**	**GD-853**	
Ten	**£28·00**	**28·00**	*ax*
Each	**£ 3·10**	**3·10**	

SINTAGLASS GAS FILTER TUBES

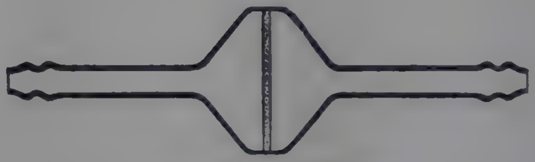
GAS FILTER TUBES, *SintAglass*, with flat sintered glass plate.

Plate diameter	30	65	90	120 mm	
Overall length	150	230	260	350 mm	
Porosity	List Numbers				
1	**GD-951**	**GD-971**	**GD-981**	**GD-991**	
2	**GD-952**	**GD-972**	**GD-982**	**GD-992**	
3	**GD-953**	**GD-973**	**GD-983**	**GD-993**	
4	**GD-954**	**GD-974**	**GD-984**	**GD-994**	
Ten	£12·00	26·00	43·00	—	*ax*
Each	£ 1·35	2·90	4·80	7·40	
Porosity	List Numbers				
5	—	**GD-975**	**GD-985**	—	
Ten	£—	38·00	—	—	*ax*
Each	£—	4·20	9·00	—	

- **For filtering solid particles out of gas streams**
- **Suitable only for use in systems open to atmospheric pressure**



GD-951 to GD-954



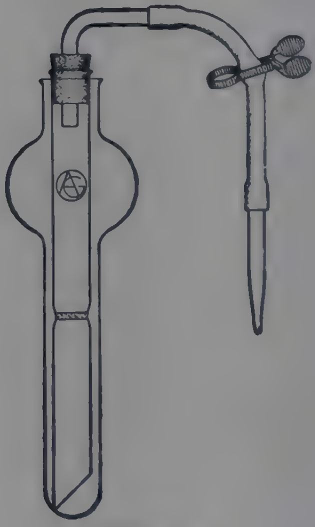
GD-971 to GD-994

GAS GENERATORS

GE-040

GAS GENERATOR, semi-micro, Ⓐ, for preparing small quantities of gases. Comprises outer vessel, 150×19 mm dia., with bulb at the top and a loose fitting inner vessel, 150×13 mm dia., with a 10 mm dia. sintered glass support disk, porosity 0. Complete with rubber stopper, bend, clip and glass jet but without chemicals.

Ten **£33·00** Each **£3·70** *bx*



GE-040

***GE-055**

GAS GENERATOR, Kipp, soda-lime glass, capacity 1000 ml. With stoppered tubulure at bottom, ground-in stopcock and safety funnel. Without chemicals.

Each **£11·00** *cx*

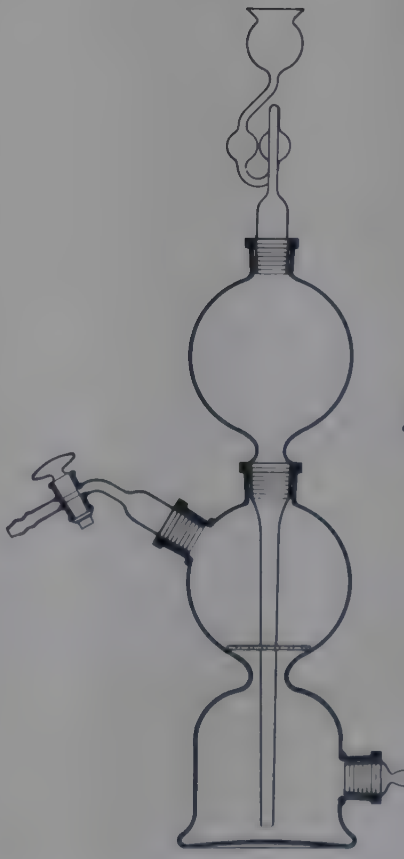
REPLACEMENT PART

FP-660 **Funnel,** thistle. For details and price see entry in List No. sequence.

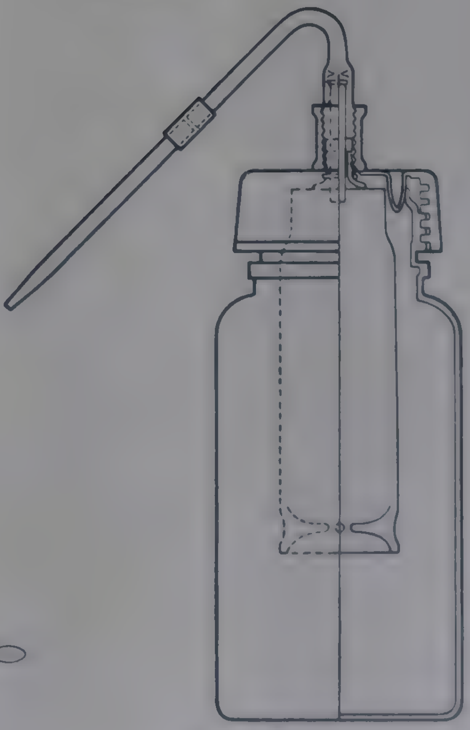
GE-080

GAS GENERATORS, *Quickfit*, for preparing common gases required in the laboratory. The borosilicate glass reaction chamber is mounted inside a polythene bottle and connected by a screw thread adapter through a valve to a glass delivery tube. Without chemicals.

Ref. No.	2G	5G	10G	
Capacity	250	500	1000 ml	
Pack of 2	£5·20	5·50	—	*jx*
Each	£2·70	2·85	3·15	



GE-055



GE-080

GAS METERS - WET TYPE

For the measurement of total gas volume used and, by timed observation, the measurement of the rate of gas flow. Suitable for inlet pressure up to 250 mm water gauge maximum.

GF-054

GAS METER, wet type, portable, nominal rating 0·5 dm³, operated on the Hyde principle with stainless steel drum. The meter is supported on three feet, two of which are adjustable, and a spirit level is fitted. Nozzle connections are for 12·5 mm bore flexible tubing. With indicating pointer, synchronised totaliser which records full meter flow, and thermometer range 0 to 50°C.

Dial scale	1 dm³
Drum revolutions/pointer revolution	2
Maximum capacity/hour for accuracy ±0·25%	60 dm³
,, ±0·5%	90 dm³
Overall dimensions	150 × 230 × 230 mm high
Weight, empty	2 kg
Each	**£80·00** *fx*

GF-056

GAS METER, wet type, portable as GF-054 but **nominal rating 2·0 dm³.** With nozzle connections for 16 mm bore flexible tubing.

Dial scale	1 dm³
Drum revolutions/pointer revolution	0·5
Maximum capacity/hour for accuracy ±0·25%	240 dm³
,, ±0·5%	360 dm³
Overall dimensions	190 × 310 × 310 mm high
Weight, empty	5 kg
Each	**£95·00** *fx*

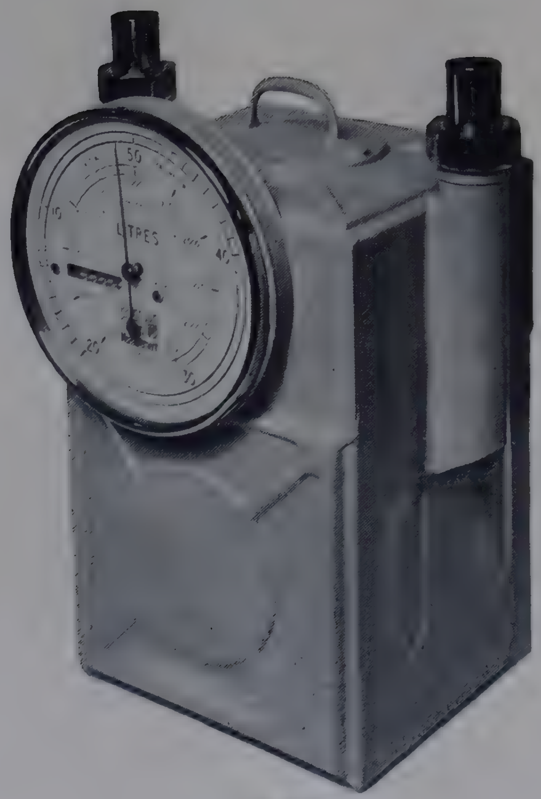
GF-056
(GF-054 is similar)

GAS METER - DRY TYPE

GF-095

GAS METER, dry type, with a central 15 cm dial with an outer scale indicating consumption and an inner scale showing the hourly rate of consumption by 1 min observation. For long period tests, a revolution counter reading up to 99,999 m³ is fitted. Must not be used at inlet pressures of more than 250 mm water gauge.

Capacity/revolution	50 litres
Maximum capacity/hour for accuracy ±0·5%	5000 litres
Overall dimensions	210 × 260 × 350 mm high
Weight, net	6 kg
Each	**£47·00** *fx*



GF-095

GAS FLOWMETERS see FL-420 et seq. in List No. sequence.

GAS SAMPLING

GF-400

GAS SAMPLING TUBE, (AG), **borosilicate glass,** to BS 2069 Type 1, with two stopcocks. Capacity 250 ml.
Ten **£23·50** Each **£2·60** *ax*

GF-405

GAS SAMPLING TUBES, (AG), **borosilicate glass,** to BS 2069 Type 2, with two double oblique bore stopcocks.

Capacity	100	250 ml	
Ten	**£33·00**	**35·00**	*ax*
Each	**£ 3·70**	**3·90**	

***GF-415**

GAS SAMPLING SYRINGE, 100 ml, with scale subdivided 1 ml. The precision ground barrel and plunger give a very low rate of gas leakage making the syringe eminently suitable for gas sampling, mixing and transfer. The tapered delivery nozzle is 40 mm long and fits 6 to 6·5 mm bore flexible tubing ... ... Each **£5·00** *mx*

GF-430

GAS SAMPLING ASPIRATOR, comprising a rubber bellows with hard plastics end covers, leather strap handles and plastics nozzle. Capacity about 2·8 litres.
Each **£17·50** *mx*

Blowballs see PLASTICS AND RUBBER SUNDRIES.

GF-470

DUST ESTIMATION APPARATUS, (AG), comprising a glass vessel with ground sockets and stoppers in which a 30 × 77 mm absorption thimble may be fitted. The gas being sampled is passed through the apparatus so that dust collects in the thimble. As some water is retained by the thimble, it is necessary to weigh before and after drying. **Without drying tubes or absorption thimble.**
Each **£4·90** *ax*

GF-473 **Absorption thimbles,** 30 × 77 mm, double thickness, suitable for above apparatus ... Box of 25 **£3·10** *mx*

For suitable **drying tubes** see AB-655 and AB-665.

GAS WASHBOTTLES

GF-480

BOTTLES, Woulff, glass, with two ground socket necks.

Capacity	500	1000 ml	
Socket No.	14/23	19/26	
Each	**£1·60**	**2·26**	*mx*

GF-482

BOTTLES, Woulff, glass, with three ground socket necks.

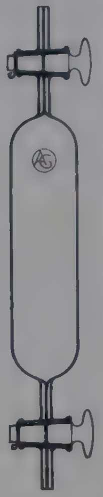
Capacity	500	1000 ml	
Socket No.	14/23	19/26	
Each	**£1·86**	**2·62**	*mx*

ACCESSORIES

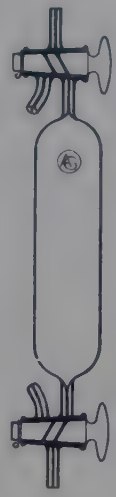
Joint size	14/23	19/26
Long entry tube	Q-MF 15/1B	Q-MF 15/2B
Short exit tube	Q-MF 10/1B	Q-MF 10/2B
Stopper	Q-SB 14	Q-SB 19
For prices see entries in *Quickfit* section.		

GF-500

GAS WASHBOTTLE, (AG), Capacity 40 ml, overall height 125 mm, diameter 25 mm.
Ten **£6·00** Each **£0·66** *ax*



GF-400



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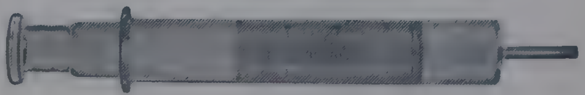

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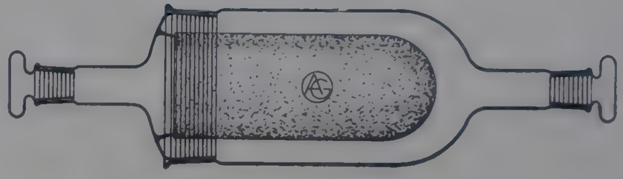

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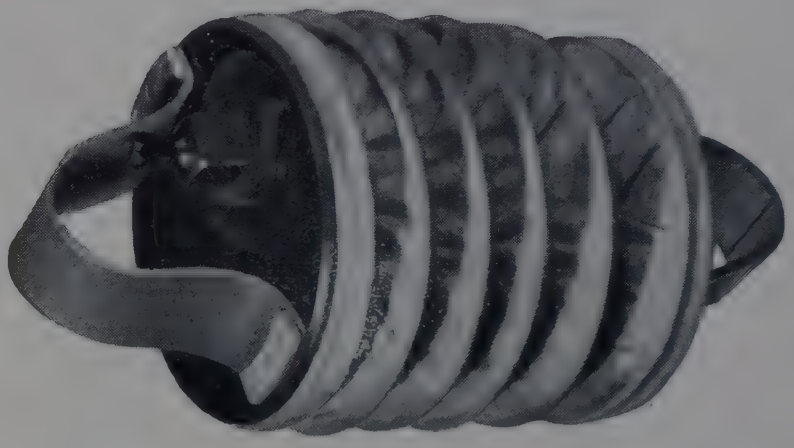

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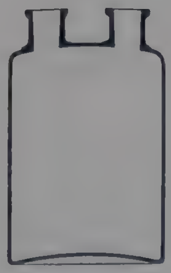
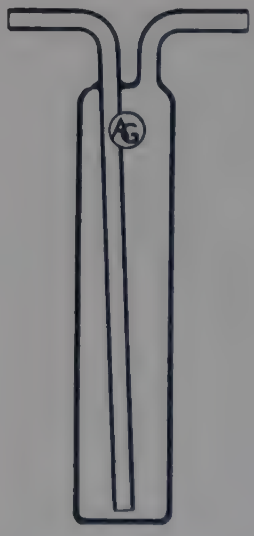
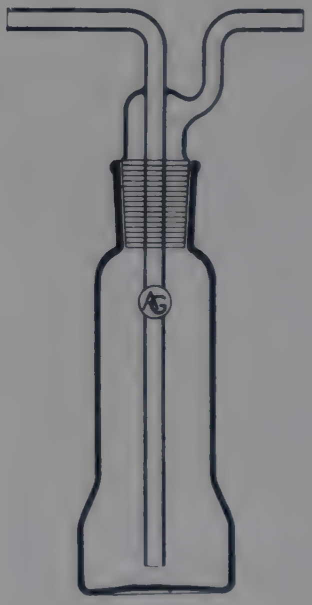


GF-480



GF-500



GF-520

GF-520

GAS WASHBOTTLES, Drechsel, (AG), to BS 2461, with interchangeable ground-in head and 24/29 joints.

Capacity	125	250	500 ml	
Ten	**£12·00**	**13·00**	**16·00**	*ax*
Each	**£ 1·35**	**1·45**	**1·80**	

REPLACEMENT PARTS for GF-520

GF-522 **Head,** with 24/29 cone and distribution tube of length suitable for 500 ml bottle which the user can cut down when required on the smaller bottles.
Ten **£7·20** Each **£0·80** *ax*

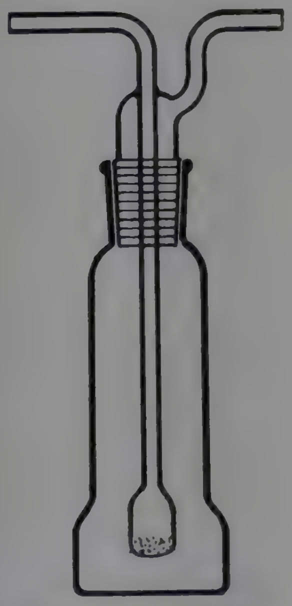
GF-658
GF-688
GF-718 } **Bottles,** see entry on next page.

SINTAGLASS GAS WASHBOTTLES

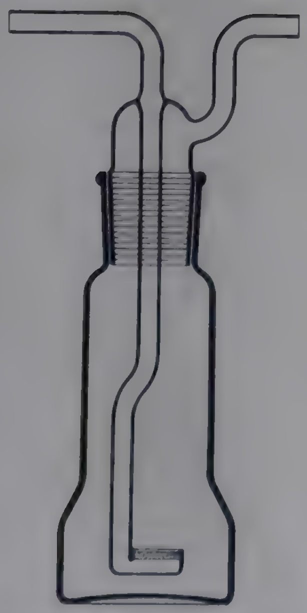
- **Close tolerance porosity ranges**
- **Colour code indication of porosity**
- **Non-friable sintered plates**
- **Made from borosilicate glass**

Porosity	Code colour	*Sintaglass*, range of maximum pore dia.
		µm
0	White	200 – 250
1	Yellow	100 – 120
2	Green	40 – 50

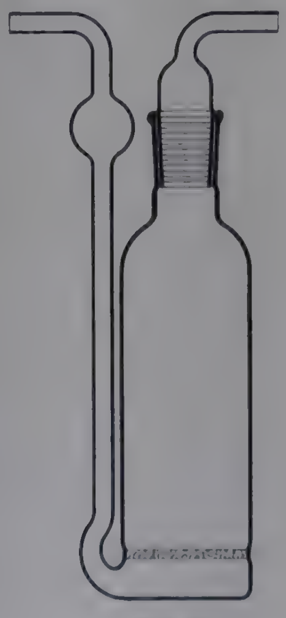
For other useful information see data on pages headed Sintered Glassware.



GF-640 to GF-702



GF-740 to GF-772



GF-801
GF-821

GAS WASHBOTTLES, *Sintaglass*, **Drechsel,** with **domed** sintered glass bulb on the distribution tube for efficient dispersion and washing. Comprises bottle and interchangeable head, joint size 24/29.

Capacity	125	250	500 ml	
Porosity		List Numbers		
0	**GF-640**	**GF-670**	**GF-700**	
1	**GF-641**	**GF-671**	**GF-701**	
2	**GF-642**	**GF-672**	**GF-702**	
Ten	£21·00	22·00	26·50	*ax*
Each	£ 2·35	2·45	2·95	

REPLACEMENT PARTS

	Capacity	125	250	500 ml	
	Porosity		List Numbers		
Heads	0	GF-650	GF-680	GF-710	
	1	GF-651	GF-681	GF-711	
	2	GF-652	GF-682	GF-712	
	Ten	£16·00	16·50	17·00	*ax*
	Each	£1·80	1·85	1·90	
Bottles		GF-658	GF-688	GF-718	
	Ten	£7·20	7·20	9·60	*ax*
	Each	£0·80	0·80	1·06	

GAS WASHBOTTLES, *Sintaglass*, **Drechsel,** with **flat** sintered glass plate on the distribution tube. Comprises bottle and interchangeable head.

Capacity	125	250 ml	
Joint size	29/32	40/38	
Porosity	List Numbers		
0	**GF-740**	**GF-770**	
1	**GF-741**	**GF-771**	
2	**GF-742**	**GF-772**	
Ten	£26·50	33·00	*ax*
Each	£ 2·95	3·70	

REPLACEMENT PARTS

	Capacity	125	250 ml	
	Porosity	List Numbers		
Heads	0	GF-750	GF-780	
	1	GF-751	GF-781	
	2	GF-752	GF-782	
	Ten	£19·00	23·50	*ax*
	Each	£ 2·15	2·60	
Bottles		GF-758	GF-788	
	Ten	£8·40	9·60	*ax*
	Each	£0·94	1·06	

GAS WASHBOTTLES, *Sintaglass*, with **flat** large diameter sintered glass plate giving excellent absorption at very high flow rates. Comprises bottle with integral sintered plate and interchangeable head.

Capacity	100	500 ml	
Plate diameter	40	65 mm	
Joint size	19/26	29/32	
Porosity	List Numbers		
1	**GF-801**	**GF-821**	
Ten	£36·00	47·00	*ax*
Each	£ 4·00	5·20	

GAUGES FOR LINEAR MEASUREMENTS

GJ-100

CALIPER, boxwood, with brass slide, two scales 0–10 cm and 0–4 in, and verniers reading to 0·1 mm and 0·01 in. Each **£1·44** *mx*

***GJ-110**

CALIPER, plated steel, with thumb roller and locking screw, for external, internal and depth measurements. Two scales 0–12 cm and 0–5 in, each with vernier reading to 0·1 mm and 1/128 in respectively. Maximum jaw opening 11 cm ... ... Each **£1·60** *mx*

***GJ-120**

CALIPER, precision, hardened stainless steel, to BS 887, with thumb release lock, for external, internal and depth measurements. The jaws and cross horns are precision ground with chamfered and relieved ends for meauring small objects. Two scales 0–16 cm and 0–6 in, each with vernier reading to 0·1 mm and 0·001 in respectively. Maximum jaw opening 14 cm ... Each **£12·00** *mx*

GJ-150

TUBING GAUGE, tapered steel, in two sections, ranges 1 to 15 mm and 15 to 30 mm in 0·1 mm. Each **£12·50** *mx*

GJ-190

DIAL GAUGE, 6 cm dia. dial, with scale 0–100, reading in 0·01 mm. The dial and bezel rotate through 360° for zero setting. The stainless steel rack spindle has a range of movement of 12 mm ... ... Each **£7·50** *mx*

GJ-200

MICROMETER-SCREW GAUGE, steel, with scale, 0–25 mm, graduated to read in 0·01 mm. Fitted with ratchet and locknut ... ... Each **£5·25** *fx*

GJ-205

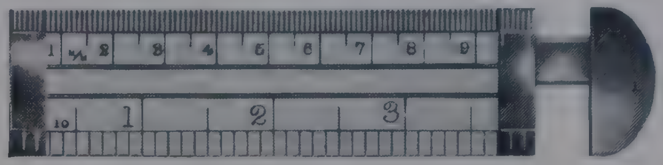
MICROMETER-SCREW GAUGE, steel, **with dual scales,** 0–25 mm graduated to read in 0·01 mm, and 0–1 in graduated to read in 0·0004 in ... Each **£6·20** *fx*

RULES

Boxwood
Maple
Steel
} see RX-021 et seq.

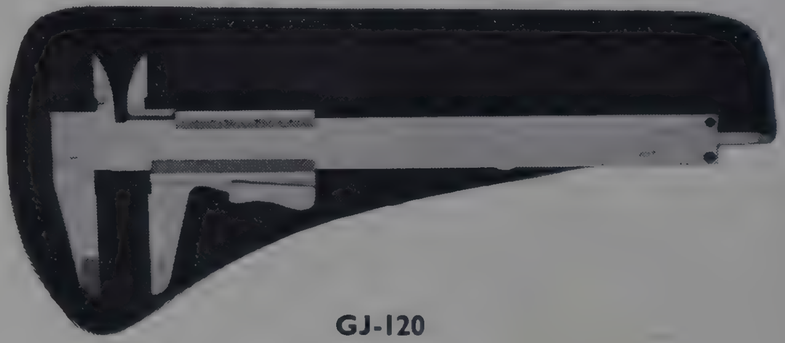
SCALES

Mirror scale see SB-220
Paper see SB-250



GJ-100

GJ-110



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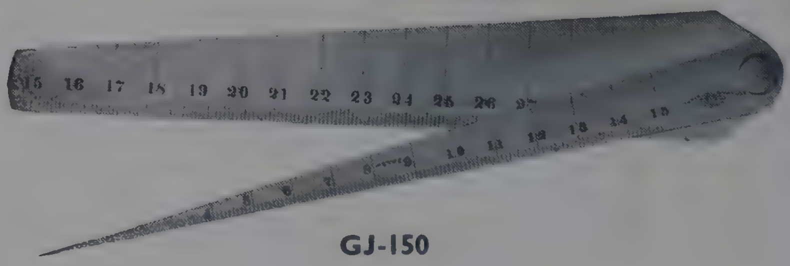
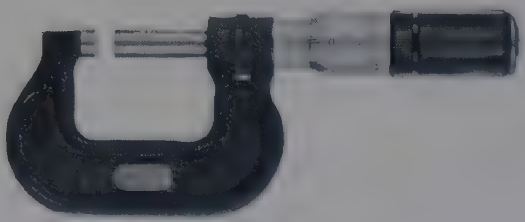


GJ-150

GJ-190



GJ-200

GJ-205

GAUGES FOR VACUUM AND PRESSURE MEASUREMENT

GJ-300

PRESSURE GAUGES, Bourdon tube, to BS 1780, with 5 cm dia. dial, scaled kgf/cm² and lbf/in². The shank is threaded $\frac{1}{8}$ in BSP.

Scale	0–1 0–15	0–2 0–30	0–4 0–60	0–7 kgf/cm² 0–100 lbf/in²	
Ten	**£18·00**	**18·00**	**18·00**	**18·00**	*cx*
Each	**£ 2·00**	**2·00**	**2·00**	**2 00**	

GJ-300

GJ-330

VACUUM GAUGE, Bourdon tube, to BS 1780, with 5 cm dia. dial, scaled 0–760 mm and 0–30 in Hg. below atmospheric pressure. The shank is threaded $\frac{1}{8}$ in BSP ... ... Ten **£16·50** Each **£1·85** *cx*

PRECISION VACUUM GAUGE, capsule dial type, see **VACUUM APPARATUS.**

GJ-350

STAND, for use with pressure gauges, GJ-300, and vacuum gauge GJ-330. Comprises a holder threaded $\frac{1}{8}$ in BSP, with horizontal tubing connectors, 9 mm external dia., and a cast iron base, 7·5 cm dia. ... Each **£0·75** *cx*

GJ-330 with GJ-350

OTHER GAUGES will be found in this catalogue under the following headings.

Air pump gauges	See Air Pumps
Steam pressure gauges	See Autoclaves
Bomb calorimeter gauges	See Calorimeters
Filter pump gauge	See Filter Pumps
Gas cylinder gauges	See Gas Cylinders
Manometer gauges	See Manometers
Coating thickness gauges	See Thickness gauges
Vacuum gauges	See Vacuum Apparatus

GAUZES

GK-100

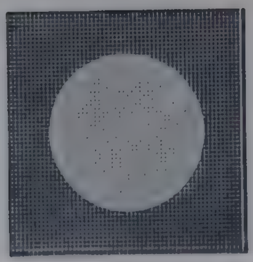
GAUZES, WIRE, iron, cut in squares.

Square	12·5	15 cm	
100	**£8·00**	**11·00**	*cx*
10	**£0·88**	**1·20**	
Each	**£0·16**	**0·19**	

GK-105

GAUZES, WIRE, iron, cut in squares, with asbestos centres.

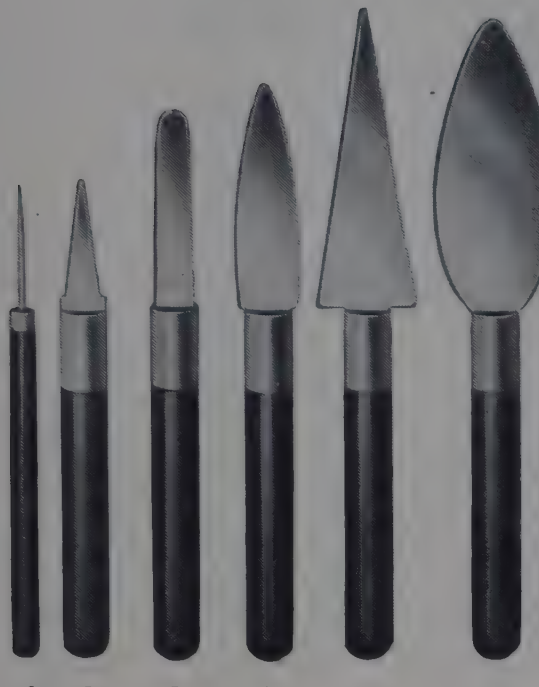
Square	12·5	15 cm	
100	**£13·00**	**15·00**	*cx*
10	**£ 1·45**	**1·70**	
Each	**£ 0·21**	**0·23**	



GK-105

GK-150

GAUZE, nylon, 120 cm wide, cut to any length. Mesh 40 holes/cm approx. Aperture size approx. 25 microns. Per 50 cm length **£2·10** *cx*



GP-100, GP-105

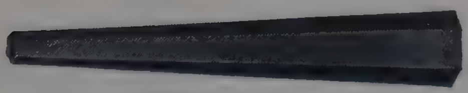
GP-100

GLASSBLOWING TOOLS, with brass blades except for No. 1, which has a nickel-chromium spike.

Pattern No.	1	2	3	4	5	6	
Ten	£5·40	6·00	6·00	6·00	6·00	6·40	*cx*
Each	£0·60	0·66	0·66	0·66	0·66	0·72	

GP-105

GLASSBLOWING TOOLS, as GP-100, set of 6, one each Nos. 1 to 6 ... 10 sets **£35·00** Set **£3·90** *cx*

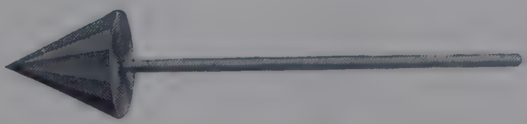


GP-130

GP-130

GLASSBLOWING TAPERS, *Gallenkamp*, light metal alloy, hexagonal in section, 150 mm long, standard taper of 1 in 10, for opening out and flanging tubes.

Size	A	B	C	
Large end	15	25	35 mm	
Small end	1·3	10	20 mm	
Ten	£6·40	9·00	13·40	*bx*
Each	£0·72	1·00	1·50	



GP-140

GP-140

GLASSBLOWING CONES, *Gallenkamp*, light metal alloy, for spinning and flanging tubes.

Dia. of cone	25	50 mm	
Ten	£7·60	10·60	*bx*
Each	£0·84	1·18	

GP-175

GP-175

GLASS-CUTTING KNIFE, *Gallenkamp*, a knife with which sharpening time is eliminated by using expendable blades of hardened steel. An ideal economy knife for the laboratory worker as well as for the professional glassblower. Supplied with twelve spare blades.
Ten **£6·80** Each **£0·76** *bx*

REPLACEMENT PART

GP-176 Blades. In pack of 25.
10 packs **£2·00** Pack **£0·26** *bx*

GP-180

GP-180

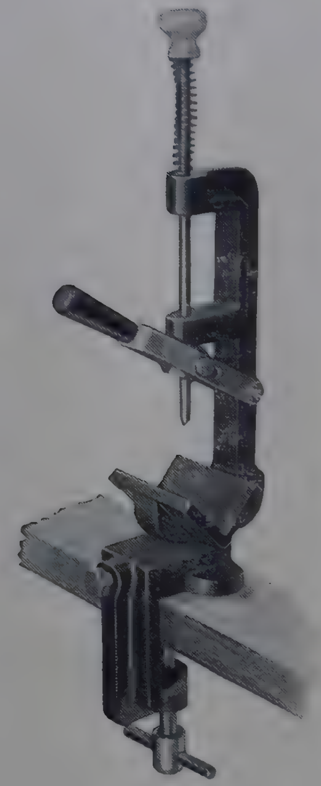
GLASS-CUTTING KNIFE, *Gallenkamp*, for use with both borosilicate and soda-lime glass. The cutting edge is double ground tungsten carbide, 32 mm long, bonded to a diecast aluminium holder, 112 mm long. With silicon carbide sharpening stone, in case.
Ten **£29·00** Each **£3·20** *bx*

GP-182

GLASS-CUTTING KNIFE, *Gallenkamp*, as GP-180, but without sharpening stone or case.
Ten **£17·50** Each **£1·95** *bx*

GP-184

SHARPENING STONE, silicon carbide.
Ten **£2·35** Each **£0·30** *bx*



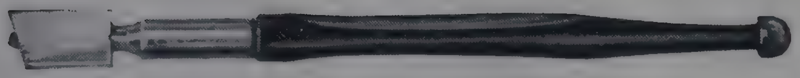
GP-190

GP-190

GLASS-CUTTING TOOL, for bench mounting. The glass tube is rotated and a true ring cut by the diamond which is brought in contact with the tube by pressing down the lever handle. Suitable for tubing up to 32 mm dia. ... ... Each **£13·00** *cx*

REPLACEMENT PART

GP-195 **Rod,** with diamond tip ... ... Each **£3·50** *cx*



GP-210

GP-210

GLASS-CUTTING DIAMOND, mounted in metal, with wooden handle ... ... Each **£1·90** *cx*

GP-225

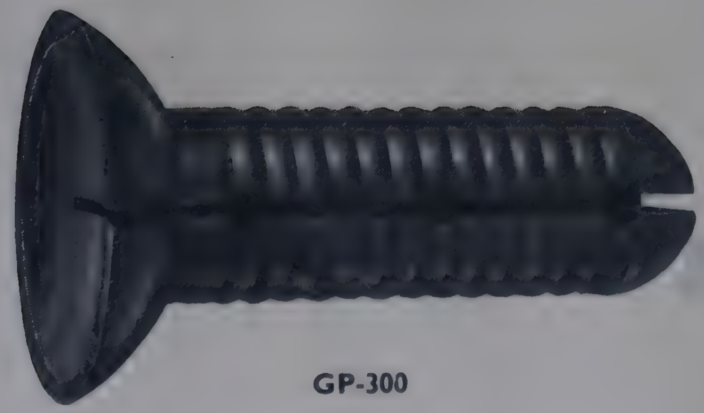
GP-225

GLASS WRITING DIAMOND, mounted in metal, with wooden handle ... ... Each **£1·30** *mx*

GP-230

GP-230

GLASS WRITING DIAMOND, pocket pattern with retractable diamond point and safety pocket clip. Each **£2·00** *cx*



GP-300

GP-300

SAFETY GRIP, for manipulating glass tubing, thermometers, etc. This is a safety device which should be in every laboratory. It is used for inserting glass tubing into rubber stoppers or corks, and protects the hands and wrists from splinters caused by breakage of the glass. It can also be used for breaking glass tubing after marking with a glass cutting knife ... ... Each **£0·65** *cx*

The following items in the catalogue will be useful for **glassblowing** purposes and full details will be found in List No. sequence.

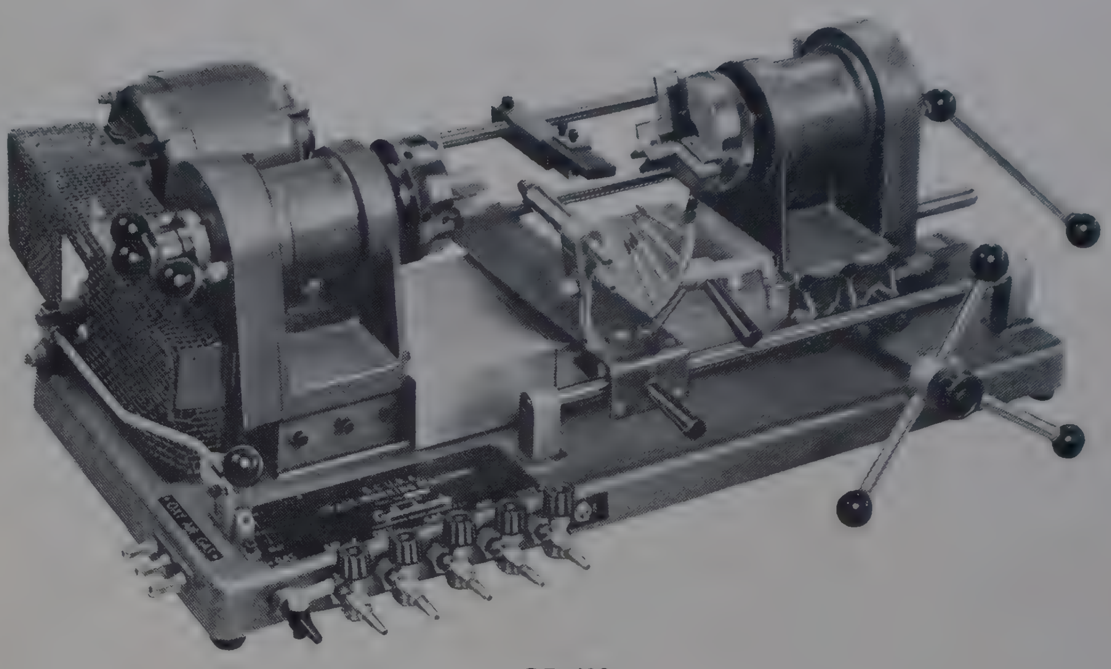
ASBESTOLITE, see FY-975
BELLOWS, see BK-620
BLOWPIPES, see BR-150 to BR-175
CORKS, see CV-010
FORCEPS, see DR-030, DR-032
GLASS TO METAL SEALS, see GR-250
GLASS ROD, see RT-020, RT-030
GLASS TUBING, see TX-250 to TX-290
GLOVES, asbestos, see CP-770, CP-775
GOGGLES, see CP-838
OXYGEN CYLINDERS AND REGULATORS, see GD-405 et seq.
PENCILS, glass marking, see PC-910
RUBBER POLICEMAN, see RV-180
SPECTACLES, see CP-890 with CP-894
TUBING GAUGE, see GJ-150

Gallenkamp GLASS WORKING LATHE

- **Permits intricate work by semi-skilled operator**
- **Increases productivity for skilled glassblower**
- **Works borosilicate or soda-lime glass**

Suitable for production of:

Straight joins · Internal seals · Flanges
Graded seals · Necks and bulbs
Cone and socket joints · Glass to metal seals
Stopcock parts.



GP-402

SPECIFICATION

Comprises a fixed headstock and a transversing tailstock, which can be locked, mounted on a base. A capstan wheel operates the tailstock and also moves a sliding cover which protects the working parts from broken glass. The chucks are driven synchronously at a speed which can be varied between 120 and 500 rev/min. A burner mounting bridge runs between the chucks and a horizontal tool mounting bar with operating lever is situated at the rear. Nozzles for flexible tubing are provided for the gas services, and control valves are fitted for the burner supplies.

Burners. Both burners supplied are for use with gas-air and gas-oxygen supplies and each burner is mounted on a ball joint to allow one-handed manipulation.

1. **Cannon burner,** with three interchangeable jets. This burner must be used with an air bleed in the oxygen line when working borosilicate glass.
2. **Crossfire burner,** four jet with integral oxygen injector.

Tools. A flat rectangular carbon tip and a cylindrical carbon tip are supplied. Both can be shaped as required by the user.

SERVICES REQUIRED

Gas — town (coal) gas, LPG (bottled) gas or natural (methane) gas.
Air — at approximately 0·7 kgf/cm² (10 lbf/in²).
Oxygen — up to approximately 1·4 kgf/cm² (20 lbf/in²).
Electricity — 220/240V 50 Hz single phase supplies.

DIMENSIONS AND DATA

Chuck bore size	32 mm
Maximum distance between chuck faces	345 mm
Minimum distance between chuck faces	130 mm
Chuck jaw opening, approximately	75 mm
Bed to chuck centre distance	110 mm
Overall length of lathe	915 mm
Overall width of lathe	710 mm
Chuck speed variable between	120 and 500 rev/min
Weight, approximately	54 kg

GP-402

GLASS WORKING LATHE, *Gallenkamp,* a complete working outfit as specification, comprising lathe, cannon and crossfire burners, chucks, flat forming tool with six carbons, flanging tool with six carbons, hand tool handle blowing attachment and swivel. For air, oxygen and **town's (coal) gas supplies.** With drive motor for 220/240V 50 Hz single phase supplies ... Each **£695·00** *gx*

GP-404

GLASS WORKING LATHE, *Gallenkamp,* as GP-402 but for **LPG (propane/butane) supplies.** With drive motor for 220/240V 50 Hz single phase supplies. Each **£700·00** *gx*

GP-406

GLASS WORKING LATHE, *Gallenkamp,* as GP-402 but for **natural (methane) gas supplies.** With drive motor for 220/240V 50 Hz single phase supplies. Each **£745·00** *gx*

Machines for other electrical supplies, quotation on application.

ACCESSORIES AND REPLACEMENTS

GP-426	**Carbon tip,** rectangular... ...	Pack of 6	**£2·20**	*gx*
GP-431	**Carbon tip,** cylindrical	Pack of 6	**£0·60**	*gx*
GP-440	**Headstock 3-jaw chuck,** mounted complete on backplate with fixing screws	Each	**£56·50**	*gx*
GP-445	**Tailstock 3-jaw chuck,** mounted complete on backplate with fixing screws	Each	**£56·50**	*gx*
GP-450	**Blowing swivel,** for mounting in end of glass tube projecting through headstock mandrel.	Each	**£2·80**	*gx*
GP-455	**Independent 4-jaw chuck,** for use on headstock, mounted complete on backplate with fixing screws.	Each	**£72·00**	*gx*
GP-470	**Instruction manual,** additional copies.	Each	**£0·80**	*gx*
AF-445	**Air pump,** to supply compressed air to burners	For prices see entries in List No. sequence		
BR-240	**Hand blowpipe,** *Flamemaster* and accessories			
GP-100	**Glassblowing tools**			
GP-130	**Glassblowing tapers**			
GP-140	**Glassblowing cones**			
GP-180	**Glass cutting knife**			
TX-865	**T-tubes,** 36×7·5 to 8 mm for using cannon burner with oxygen-air mixtures			
TX-525	**Tubing,** medium wall H6·5			

***GR-100**

GLASS BALLS, solid, for use as packing in gas absorption or washing tubes. In pack containing approx. 250 ml.

Dia. approx.	3	4	6 mm	
Pack	**£1·20**	**1·20**	**1·20**	*cx*

GR-140

GLASS TAPE, close woven, suitable for binding, insulation or tying. Reels of approx. 45 metres, 25 mm wide, 0·25 mm thick ... Ten **£13·60** Each **£1·50** *cx*

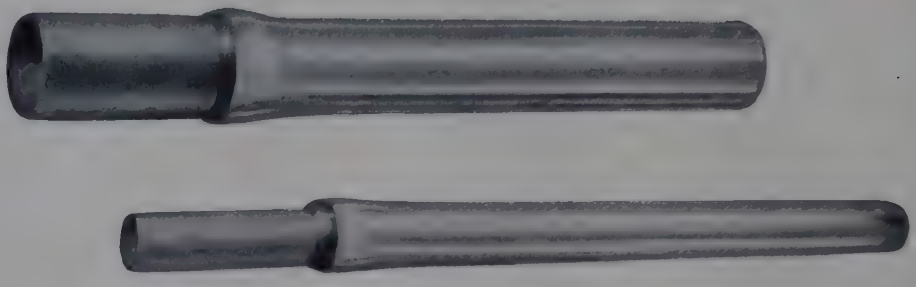
GR-150

GLASS WOOL, specially prepared glass fibres for filtration purposes. In pack of 450 g.
10 packs **£6·00** Pack **£0·66** *cx*

GR-160

QUARTZ WOOL, fused *Vitreosil*, comprises a mass of very fine quartz fibres of average dia. 6 μm, resembling cotton wool in appearance. It is used in the filtration of acid liquids and hot gases and for making separating plugs for fillings in combustion tubes. In packs of 10 g.
Pack **£2·60** *cx*

GLASS FIBRE FILTERS	see FILTER PAPERS
GLASS TUBING	see TUBING
GLASSWARE DRYERS	see OVENS, also WASHING & DRYING EQUIPMENT
GLOVES	see CLOTHING, PROTECTIVE



GR-250

GR-250

GLASS TO METAL SEALS, made from metal alloy tubing joined via a 4-stage graded seal to borosilicate glass. The metal portion may be joined to metal apparatus by soft soldering or, provided sudden heat is not applied, may be silver-soldered or brazed. The glass, with expansion coefficient $3{\cdot}2 \times 10^{-6}$, seals readily to all common borosilicate laboratory glassware. The seals are suitable for high vacuum work, and are supplied fully annealed and chemically cleaned.

Dia. external	6	13	19	25 mm	
Length metal +seal	12	12	18	25 mm	
Length glass	75	75	100	100 mm	
Each	**£1·70**	**2·20**	**2·35**	**2·60**	*cx*

Gallenkamp GLOVE BOX

REGD. TRADE MARK

with automatic air-lock loading hatch

Suitable for handling:—

Low activity radioisotopes
Toxic powders
Hygroscopic substances
Bacteriological materials

- **Automatic air-lock loading hatch**
- **Large viewing window**
- **Choice of latex or neoprene gloves**

For details and price see MA-950 in List No. sequence.

ELECTRIC IMMERSION HEATERS

***HD-100**

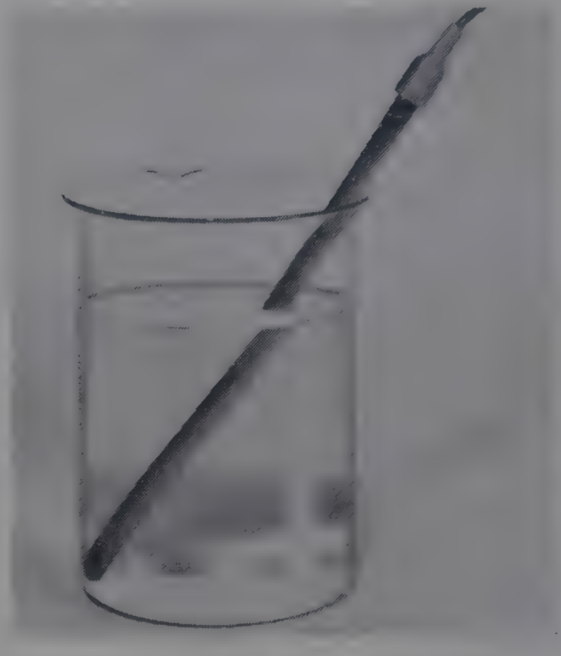
HEATERS, immersion, portable type, with heating element sheathed in plated copper tube. An extremely convenient low wattage heater fitted with a thermally and electrically insulated handle and a length of 3-core cable. For 220/240V supplies.

Loading	200	500	1000 W	
Length	18	18	23 cm	
Each	**£2·40**	**2·40**	**3·00**	*fx*

HEATERS, immersion, *Electrothermal 'Red-Rod'*, comprising a heating element totally enclosed in a silica sheath, complete with 1·8 m of 2-core connecting cable. A radiant immersion heater which will go up to red heat, suitable for heating liquids in beakers, tanks, water-baths, etc. For 230/250V supplies.

List No.	Watts Loading	Overall length cm	Heated length cm	Each	
				£	
HD-113	300	25	13	**6·60**	*fx*
HD-114	400	31	15	**7·05**	*fx*
HD-115	500	36	20	**7·55**	*fx*

HD-100

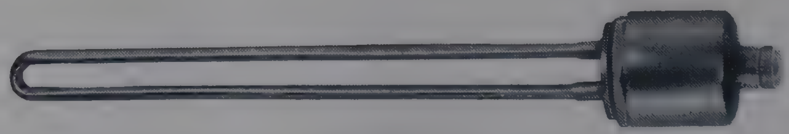

HD-113 to HD-115

HAEMACYTOMETERS see MEDICAL SCIENCES
HEATER, AQUARIUM see BIOLOGY
HEAT TREATMENT see FURNACES

HD-152

HEATERS, immersion, with nickel plated copper sheathed hairpin element mounted under a flanged head threaded 1·55 in dia. × 26 t.p.i. Suitable for use in water baths either vertically or mounted through a hole in the side of the bath. Terminals are enclosed with gland entry for cable connection. Supplied complete with two joint rings and threaded locking ring. For 220/240V supplies.

Loading	250	500	1000W
Length overall	37	45	53 cm
Length of hairpin	30	37	45 cm
Length of heated section	25	31	37 cm
Each	**£5·50**	**5·60**	**5·90**


HD-152

HD-180

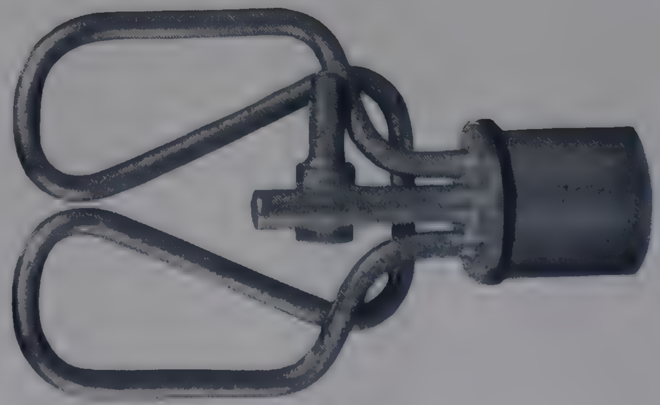
HEATERS, immersion, safety type, with tubular element in rectangular nickel plated copper sheath. Fitted with BS 3283 3-pin safety connector which is automatically ejected if the water level falls below the safe limit. Requires $1\frac{9}{16}$ in (39·7 mm) hole for mounting. Complete with sealing washers, threaded locking ring and connector. For 110/120, 200/210 or 220/240V supplies.

Loading	750	1000	1500	2000 W	
Immersion length from flange	110	132	132	132 mm	
Width	88	117	117	117 mm	
Each	**£2·18**	**2·18**	**2·18**	**2·18**	*fx*

When ordering heaters please specify voltage.

REPLACEMENT PART

HD-182 **Set of sealing washers.** 10 sets **£0·55** Set **£0·13** *mx*


HD-180

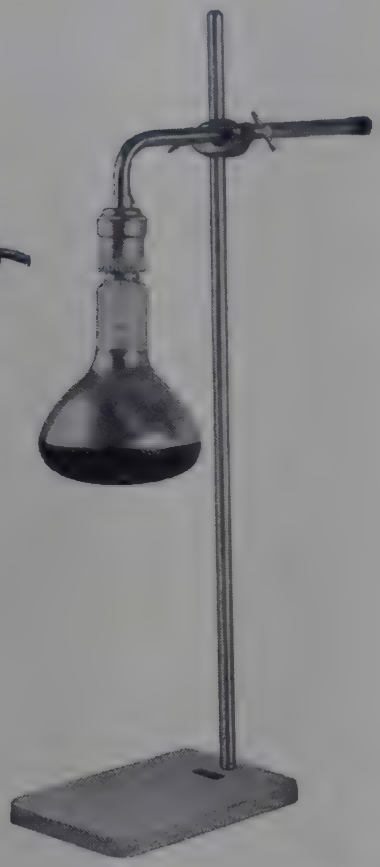
RADIANT HEATER

HD-230

HEATER, radiant, *Vitreosil,* with element enclosed in fused silica. Designed to enable heating to be carried out from above, thus ensuring rapid evaporation without loss by spattering. It may also be inverted and used as a normal hotplate. Heating surface dia. 12·5 cm. Loading 400W. For 220/240V supplies. Without stand or bosshead ... ... Each **£24·50** *fx*

Other voltages available to order.

HD-230 on suitable stand



HD-262 on suitable stand

INFRARED HEATER

For the rapid drying of small quantities of material, evaporation where splashing must be avoided, as in isotope work, or the application of local heat to an assembly such as a fractional distillation column. The sample temperature may be controlled by adjusting the distance from the lamp to the material.

The heater comprises a 275W infrared lamp, with built-in silvered reflector, mounted in an ES lampholder carried on a 20 cm long, 12·5 mm dia. tube which may be fixed into a standard bosshead. The 3-core connecting cable is taken through the centre of the tube.

HD-262

HEATER, infrared, as specification, without stand or bosshead.

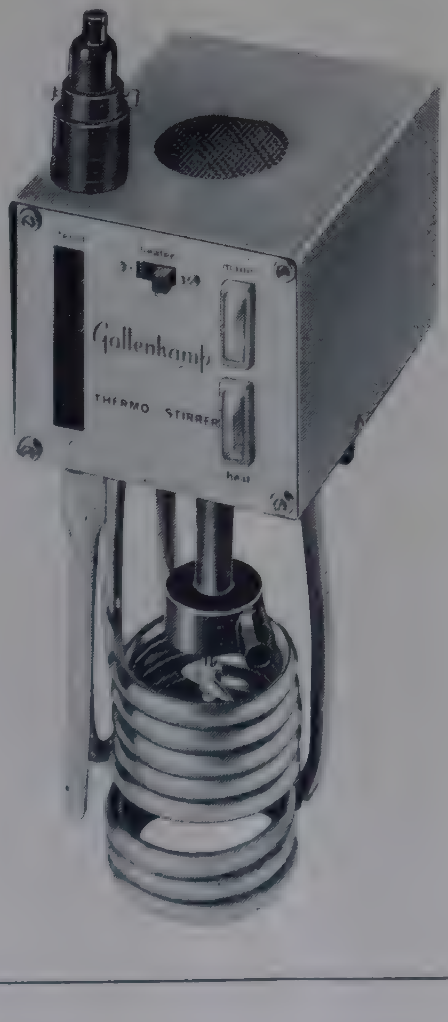
For 200/250V supplies	Each	**£4·90** *mx*
For 110/120V supplies	Each	**£4·90** *mx*

REPLACEMENT PART

HD-265 **Lamp bulb,** infrared, 275W.

For 200/250V supplies	Each	**£1·90** *mx*
For 110/120V supplies	Each	**£1·90** *mx*

When ordering please state voltage.



Gallenkamp THERMO STIRRERS

For converting suitable containers into temperature controlled water and oil baths. Both models incorporate heaters, thermostats and efficient stirrers which can be converted into pumps for the external circulation of water at controlled temperatures.

- **Temperature range from ambient plus 5degC to 100°C**
- **Quiet and reliable operation**
- **Suitable for a wide range of bath sizes**

TM-840

THERMO STIRRER 1

- Direct reading temperature control.
- 1500W sheathed immersion heater.
- Temperature fluctuation 0·4degC or less.

TM-860

THERMO STIRRER 2

- Temperature controlled by contact thermometer and solid state relay.
- 1000W standard and 1500W accessory heaters.
- Temperature fluctuation 0·05degC or less.

Full details, prices and accessories see THERMOREGULATION.

HEATING BLOCKS

Applications in haematology, pathology, bacteriology, prothrombin testing, drying, melting and boiling point checks and other routine tests in which a liquid heating medium is undesirable.

These blocks comprise an outer case, with heater and thermostat, into which are fitted interchangeable aluminium blocks drilled to accept test tubes.

Temperature control is by means of a direct reading solid state thermostat designed for zero voltage switching to minimise radio interference.

The stove enamelled outer case is insulated and ventilated and designed to be impervious to small amounts of accidentally spilled samples. Controls include mains and load indicator lamps, mains switch and fuse. With HD-354 the controls are mounted in a separate control box connected by a 100 cm lead to the heating case.

Technical data

	HD-350	HD-352	HD-354
Temperature range °C	30—100	30—100	90—180
Temperature control degC	±0·1	±0·1	±0·2
Time to max. temperature min	12	18	30
Dimensions (HWD) cm	10×19×14	10×29×23	10×30×22 (case) 9×13×11 (control box)
Weight, net kg	1·25	2·75	3
Power rating, max. W	250	450	450

HD-350

HEATING CASE, *Techne*, as specification, **for single block.** Temperature range 30 to 100°C. Accepts but does not include one accessory block. For 220/240V 50/60 Hz single phase supplies ... ... Each **£31·00** *fx*

HD-352

HEATING CASE, *Techne*, as specification, **for three blocks.** Temperature range 30 to 100°C. Accepts but does not include three accessory blocks. For 220/240V 50/60 Hz single phase supplies ... ... Each **£49·50** *fx*

HD-354

HEATING CASE, *Techne*, as specification, **for three blocks.** Temperature range 90 to 180°C. With controls mounted in a separate control box. Accepts but does not include three accessory blocks. For 220/240V 50/60 Hz single phase supplies ... ... Each **£65·00** *fxN*

When ordering please state voltage and frequency of supply.

ACCESSORIES

Each block weighs approximately 1 kg.

HD-362	**Block,** aluminium, 20 hole, for 12 mm dia. tubes.	Each	**£5·00**	*fx*
HD-364	**Block,** aluminium, 12 hole, for 16 mm dia. tubes.	Each	**£5·00**	*fx*
HD-366	**Block,** aluminium, 8 hole, for 19 mm dia. tubes.	Each	**£5·00**	*fx*
HD-368	**Block,** aluminium, 6 hole, for 25 mm dia. tubes.	Each	**£5·00**	*fx*

Dri-Block DB-1

HD-350 with block and tubes

Dri-Block DB-3H
Laboratory temperature controller

HD-354 with blocks and tubes

Gallenkamp HOTPLATES

REGD TRADE MARK

- Retort rod or bench mounting
- Circular or rectangular plate
- Thermostatic or energy regulator control

For details and prices see HL-010 et seq. in List No. sequence.

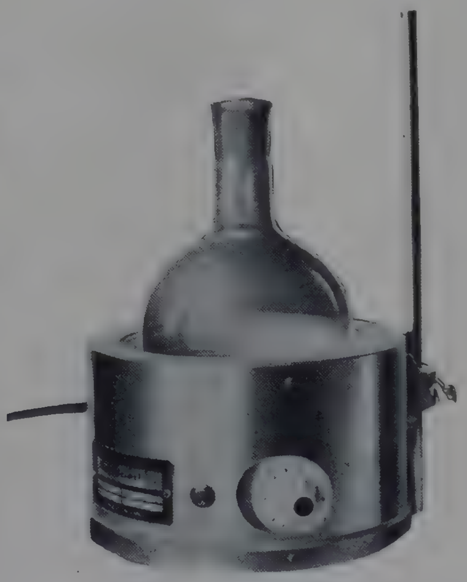
HEATING MANTLES

Mantles are mounted in metal containers and are sufficiently flexible to fit snugly around flasks of the stated nominal capacity but with varying diameters. The heaters run at low temperatures compared with other heaters such as Bunsen burners, and so reduce fire risk. Normal maximum working temperature is 450°C.

Controllers

Satisfactory temperature control may be obtained by operating the mantles off power, voltage or current regulators such as energy regulators, variable transformers or rheostats, see ELECTRICAL CONTROLS. Series MS mantle have integral energy regulators.

HD-500
with flask



HD-508 with rod
and flask

GENERAL PURPOSE MANTLES

HD-500

HEATING MANTLES, *Electrothermal,* **Series M,** for flasks, as specification, in metal container with wide rim. A thermocouple is incorporated in mantles of 1 litre or more, and the larger sizes, from 5 litres, with more than one circuit, have an indicator lamp for each circuit which can be controlled separately. The 20 litre size is fitted with a terminal box. Other sizes are fitted with 3-core cable. For 200/250V supplies.

HD-505

HEATING MANTLES, *Electrothermal,* **Series MY,** similar to the HD-500 series, but in economy container without built-in thermocouple or indicator lamp. A bracket for mounting a support rod is fitted at the rear. Fitted with 3 ft of 3-core cable. For 200/250V supplies.

HD-508

HEATING MANTLES, *Electrothermal,* **Series MS,** as HD-505 but with built-in energy regulator control. For 200/250V a.c. single phase supplies.

For sizes and prices of HD-500 to HD-508 see table below.

Flask capacity	Loading Watts	Mantles for 200/250V supplies			**HD-510** Replacement heating elements Each
		HD-500 Each	**HD-505** Each	**HD-508** Each	
		£	£	£	£
50 ml	60	**8·60** *fx*	**6·60** *fx*	—	**4·40** *fx*
100 ,,	60	**9·65** *fx*	**7·30** *fx*	—	**4·85** *fx*
250 ,,	150	**10·40** *fx*	**8·40** *fx*	**11·60** *fx*	**5·65** *fx*
500 ,,	200	**12·20** *fx*	**9·40** *fx*	**12·50** *fx*	**6·20** *fx*
1 litre	300	**†14·40** *fx*	**10·40** *fx*	**13·60** *fx*	**7·25** *fx*
2 ,,	500	**†17·10** *fx*	**12·50** *fx*	**15·40** *fx*	**8·50** *fx*
3 ,,	500	**†21·10** *fx*	**15·60** *fx*	—	**10·60** *fx*
5 ,,	800	**†27·50** *fx*	**20·20** *fx*	—	**13·75** *fx*
10 ,,	1000	**†33·90** *fxN*	**26·60** *fxN*	—	**17·35** *fxN*
20 ,,	1500	**†47·80** *fxN*	—	—	**23·20** *fxN*

† Fitted with thermocouple for use with pyrometer HD-550.

Larger sizes of mantles are available. Details on application.

REPLACEMENT PARTS

HD-510 **Heating elements,** for mantles HD-500, HD-505 and HD-508. For prices see table above.

ACCESSORIES

HD-550 **Pyrometer,** bench stand type, with compensating leads, scale 0 to 500°C ... ... Each **£20·50** *fxN*

For suitable control units see EC-810 and ED-600 in List No. sequence.

For suitable support rods, clamps, etc. see SM-360 et seq. in List No. sequence.

SEMI-MICRO HEATING MANTLE, *Electrothermal,* **Series MR,** for pear shape and round bottom flasks capacity 10 to 50 ml. In metal housing with energy regulator and support rod. Loading 60W.

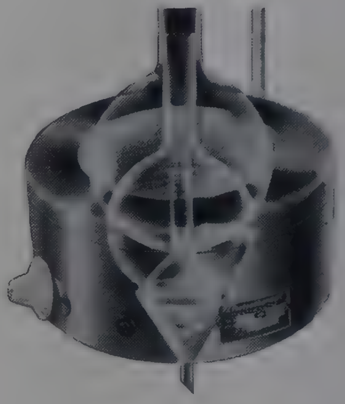
HD-575

SEMI-MICRO HEATING MANTLE, *Electrothermal,* **Series MR,** with mains and load indicator lamps. For 200/250V a.c. supplies ... ... Each **£12·60** *fx*

HD-575

MULTI-MANTLES, *Electrothermal,* **Series MV,** for a large range of different shapes and sizes of flasks and funnels. An opening in the base permits funnels to be inserted and heated. Fitted with energy regulator and support rod socket. Maximum working temperature is 450°C. For 200/250V a.c. supplies.

MULTI-MANTLES				Replacement elements	
List No.	Flask capacity	Loading Watts	Each £	List No.	Each £
HD-650	50 to 500 ml	300	**11·70** *fx*	**HD-670**	**5·80** *fx*
HD-654	50 to 2000 ml	450	**20·10** *fx*	**HD-672**	**8·50** *fx*
HD-658	0·5 to 6 litres	800	**34·10** *fx*	**HD-676**	**15·45** *fxN*
HD-662	2 to 12 litres	1000	**49·50** *fxN*	**HD-680**	**20·70** *fxN*
HD-666	5 to 22 litres	1500	**60·30** *fxN*	**HD-684**	**26·25** *fxN*


HD-654

HEATING MANTLES, *Electrothermal,* **Series MB,** for squat form beakers. For 200/250V a.c. supplies.

List No.	Beaker capacity	Loading Watts	Each £	
HD-752	100 ml	60	**13·05**	*fxN*
HD-754	250 ml	150	**14·05**	*fxN*
HD-758	600 ml	200	**15·65**	*fxN*
HD-760	1000 ml	300	**22·40**	*fxN*

HEATING MANTLES, *Electrothermal,* **Series MD,** for 60° funnels, with metal rim, support rod and elastic aperture for stem of funnel. For 200/250V a.c. supplies.

List No.	Funnel dia.	Loading Watts	Each £	
HD-852	50 mm	60	**11·85**	*fxN*
HD-854	75 mm	60	**13·05**	*fxN*
HD-856	100 mm	200	**15·35**	*fxN*
HD-858	125 mm	300	**18·40**	*fxN*

HD-752 with beaker

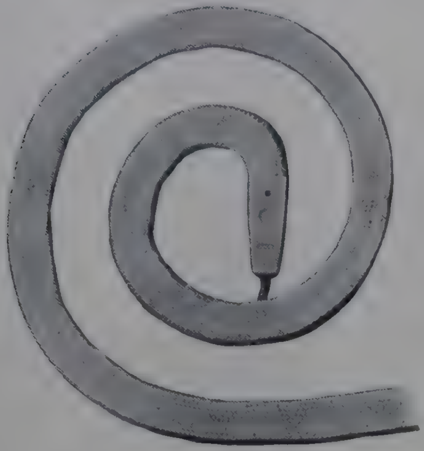
CONTROL ACCESSORIES for models without built-in regulator.

Control units see EC-810 *et seq.*
Variable transformers see ED-600 *et seq.*
Rheostats see ED-320 *et seq.*

HEATING/STIRRING MANTLES, *Electrothermal,* with flexible heating element and magnetic drive mounted in a metal housing. Include built-in energy regulator for temperature control up to 450°C and stirring speed controller. With ptfe covered stirring follower. For 220/250V 50 Hz single phase supplies.

List No.	Flask capacity	Follower length	Loading watts	Each £	
HD-870	250 ml	12 mm	150	**37·00**	*fx*
HD-871	500 ml	28 mm	200	**37·00**	*fx*
HD-872	1000 ml	28 mm	300	**39·00**	*fx*
HD-873	2000 ml	37 mm	500	**41·00**	*fx*

HD-852 with funnel


HE-100 to HE-115

HE-150 to HE-154

HE-250 to HE-275

HE-400

HEATING TAPES AND CORDS

Woven tapes and cords for applying heat to pipes, tubes and vessels. Must be used with suitable control unit.

HEATING TAPE (Heat-by-the-yard), *Electrothermal,* **Series HT,** for user to cut to required length and fit insulated terminals. Maximum rating 30V per metre. Maximum temperature 450°C. With voltage/temperature nomogram but without end connectors.

List No.	Length cm (approx.)	Width mm (approx.)	Each	
			£	
HE-100	765	13	**21·85**	*fx*
HE-105	1530	13	**40·45**	*fx*
HE-110	765	25	**27·50**	*fx*
HE-115	1530	25	**49·90**	*fx*

ACCESSORY
HE-130 **End connectors.** In pack of 12 ... Pack **£4·70** *fx*

HEATING TAPES, *Electrothermal,* **Series HT3,** which dissipate about 0·5W/cm² for temperatures up to 450°C. Supplied with glass laces for securing and mains lead-in wires for 200/250V supplies.

List No.	Length cm (approx.)	Width mm (approx.)	Watts	Each	
				£	
HE-150	125	13	70	**5·05**	*fx*
HE-152	90	25	100	**5·55**	*fx*
HE-154	180	25	210	**8·00**	*fx*

HEATING CORDS, *Electrothermal,* which dissipate about 4W/cm² when close wound, for temperatures up to 450°C. Approx. 5 mm dia. in several lengths, with 60 cm inactive leads. For 200/250V supplies.

List No.	Length cm	Loading W at 230V	Each	
			£	
HE-250	30	60	**3·05**	*fx*
HE-255	61	120	**3·55**	*fx*
HE-260	122	240	**5·15**	*fx*
HE-265	244	480	**8·30**	*fx*
HE-270	488	960	**12·80**	*fx*
HE-275	976	1920	**19·55**	*fx*

CONTROL UNITS for use with heating tapes and cords see EC-810 and ED-600 et seq. in List No. sequence.

ELECTRIC 'BUNSEN' HEATER

ELECTRIC 'BUNSEN' HEATER, *Electrothermal,* for heating test tubes, crucibles, beakers, etc. Construction maintains exterior sufficiently cool for heater to be held in the hand. Dissipation 400W for temperatures up to between 800°C and 1000°C. Height 18 cm.

HE-400

HEATER, BUNSEN, *Electrothermal,* as specification, for a.c. or d.c. supplies.

For 230/250V ... ... Each **£12·50** *fx*
For 200/220V ... ... Each **£12·50** *fxN*
For 100/120V ... ... Each **£12·50** *fxN*

REPLACEMENT PART
HE-410 **Heating element** ... ... Each **£4·85** *fx*

For suitable control units see EC-810 in List No. sequence.

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Catalogue headings under which apparatus of histological interest is also included: Dissecting; Jars; Microscopes; Microtomes; Plates; Refrigeration (Freezer aerosol); Tubes.

Gallenkamp WAX EMBEDDING BATH, 100°C

Suitable for most routine specimen preparations

CONSTRUCTION

The stainless steel bath is mounted in a rust-inhibited steel outer case. The stainless steel cover is recessed into the bath so that any spilt wax is prevented from running over the bench. Six plated copper pots approximately 6·3 cm dia. × 6·3 cm deep are supported by the cover. A larger pot approximately 12 cm dia. × 11 cm deep fits into the cover and may be used for storing paraffin wax. Four glass tubes of 2·5 cm dia. × 5 cm deep are provided for use with small size specimens. Overall dimensions 50 × 35 × 20 cm. The bath is uniformly heated by a 500W sheathed immersion element controlled by a direct reading *Compenstat* (solid state) thermostat to within ±0·2degC. The thermostat is mounted in a separate compartment at one end of the bath together with a mains switch and indicator lamp.

- **Maximum temperature 100°C**
- **Thermostatic control to ±0·2degC**
- **Supplied with:**
  - **wax storage vessel approx. 1200 ml capacity**
  - **6 specimen pots each approx. 200 ml capacity**
  - **4 specimen tubes each approx. 30 ml capacity**

HJ-040

BATH, WAX EMBEDDING, *Gallenkamp*, maximum temperature 100°C, as specification. Comprising water bath and stainless steel cover complete with one large and six small pots and four glass tubes. For a.c. single phase supplies.

For 220/240V	Each **£169·00**	*bx*
For 200/210V	Each **£169·00**	*bxN*
For 110/120V	Each **£169·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART
TW-600 **Tubes,** 50 × 25 mm. For price see entry in List No. sequence.

HJ-040

Gallenkamp WAX EMBEDDING OVEN, 100°C

Suitable for routine large scale impregnations

- **Air bath with twelve large embedding pots**
- **Large, heated storage space**
- **Temperature control to within ±1degC**
- **Drain cock fitted to remove spilt wax from embedding bath**

HJ-100

EMBEDDING BATH

The air bath with twelve embedding pots is protected from dust, etc., by a lift-up cover. The pots are plated copper, 7·5×4·4 cm deep, with handles and loose covers. The size of the pots permits large specimens to be treated. A draining tray extends beneath the pots to catch any spilt wax which may be removed periodically via a drain cock at the lowest point of the tray.

STORAGE COMPARTMENT

The storage compartment is fitted with a door and a perforated shelf for drying slides.

The large storage space, 33×46×43 cm high, can be used to store melted paraffin wax and may also be used for embedding very large specimens.

HEATING AND TEMPERATURE CONTROL

Heating elements, total load 500W, are fitted outside the oven liner. The temperature is controlled to ±1degC by a bimetal thermostat. Embedding bath temperature is indicated by a built-in angle thermometer. A thermometer may also be inserted in the storage compartment.

CONSTRUCTION

The oven is constructed of welded steel and finished in grey duotone stoved enamel. The oven liner and perforated shelf are aluminium.

DIMENSIONS

	H W D
Overall	67×64×58 cm
Overall, lid open	125×64×58 cm
Storage compartment	33×45×42 cm

HJ-100

OVEN, WAX EMBEDDING, *Gallenkamp*, maximum temperature 100°C, as specification. Comprises embedding bath with hinged cover, twelve embedding pots and fitted angle thermometer and storage compartment with shelf. For a.c. single phase supplies.

For 220/240V	Each **£409·00**	*bx*
For 200/210V	Each **£409·00**	*bxN*
For 110/120V	Each **£409·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

HJ-105	**Pot, embedding,** plated copper, with loose cover.	Each **£3·60**	*bx*
HJ-108	**Thermometer,** angle, solid stem, scale span 0–110°C in 1degC	Each **£1·80**	*bx*

ACCESSORIES

TJ-320	**Thermometer,** scale span —5 to 105°C in 1degC, for storage compartment	For details and prices see entries in List No. sequence.
FP-370	**Funnels,** stainless steel, for paraffin wax	
JV-140	**Jugs,** stainless steel, for paraffin wax	

Gallenkamp HOT AIR OVENS

See OV-010 et seq. in List No. sequence.

Gallenkamp WAX DISPENSER

For storing and dispensing molten wax.

- **Capacity approximately 4·5 litres**
- **Thermostatically controlled to 100°C max**
- **Preset safety thermostat**

HJ-145

HJ-145

WAX DISPENSER, *Gallenkamp*, comprises anodised aluminium tank 20·5 cm dia. × 16 cm deep (approximate capacity 4·5 litres) fitted with a lever operated dispensing tap and removable gauze filter. A lid with thermometer hole is supplied. Temperature is controlled by an hydraulic thermostat range 40° to 100°C with direct reading scale. A preset safety thermostat is incorporated to protect the apparatus in case of failure of the control thermostat. Neon lamps indicate operation of control and safety thermostats.

Overall dimensions 26 cm dia. × 32 cm high. Power rating max. 500W. For a.c. single phase supplies.

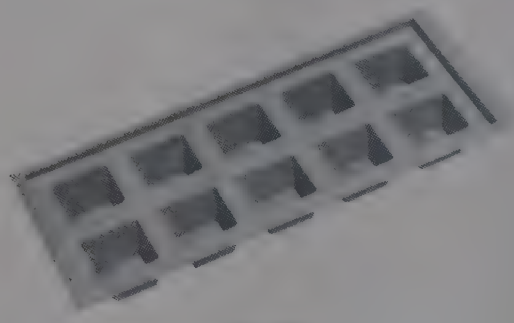
For 220/240V	Each	**£53·00**	*bx*
For 200/210V	Each	**£56·00**	*bxN*
For 110/120V	Each	**£56·00**	*bxN*

When ordering please state voltage and frequency of supply.

ACCESSORIES

HJ-185 **Embedding tray,** polystyrene, with ten recesses each 20 × 20 × 13 mm. Overall dimensions 190 × 80 × 20 mm. In pack of 100 ... ... Pack **£2·35** *mx*

TJ-060 **Thermometer,** range 0 to 105°C. For details and price see entry in List No. sequence.



HJ-185

Gallenkamp FLOATING-OUT BATH

For preparing microscopic slides after wax embedding and microtome slicing

HJ-190

FLOATING-OUT BATH, *Gallenkamp*, comprising an anodised aluminium bath 20 cm dia. × 6 cm deep, stained black to facilitate viewing of sections. The rim of the bath slopes gently towards the centre so that slides rested on the rim drain into the bath. A black anodised aluminium lid is supplied to protect bath contents from dust and to reduce evaporation. Fitted with a 500W heater. Temperature is controlled by an hydraulic thermostat range 30° to 80°C with direct reading scale. A preset safety thermostat is incorporated. Neon lamps indicate operation of control and safety thermostats. Overall dimensions 35 cm dia. × 15 cm high with lid. For a.c. single phase supplies.

For 220/240V	Each	**£38·00**	*bx*
For 200/210V	Each	**£41·00**	*bxN*
For 110/120V	Each	**£41·00**	*bxN*

When ordering please state voltage and frequency of supply.

- **Bath interior stained black to facilitate viewing of sections**
- **Thermostatically controlled to 80°C max**
- **Preset safety thermostat**

FLOATING OUT BATH

HJ-190

HJ-200

PARAFFIN SECTION MOUNTING

HJ-200

PARAFFIN SECTION MOUNTING WATER BATH, *Electrothermal*, with black matt interior, which enables the sections to be seen, and black dust cover. Fitted with energy regulator to adjust temperature from ambient to 75°C. Inside dimensions 20 cm dia. × 6 cm deep. For 200/250V a.c. supplies. Power rating 450W.
Each **£32·00** *fx*

HJ-202

PARAFFIN SECTION MOUNTING WATER BATH, *Electrothermal*, as HJ-200 but fitted with thermostat to control temperature between 40° and 80°C. For 200/250V a.c. supplies ... ... Each **£41·10** *fx*

ACCESSORY

HJ-210	**Slide drying rack,** aluminium, for 50 slides.	Each	£2·50	*fx*

MICROSCOPES

For student, research, inverted and stereoscopic models see ML-050 to MP-410 in List No. sequence.

VACUUM EMBEDDING

The single pan model comprises a removable copper pan suspended in an electrically heated water bath. A plate glass cover with rubber washer seals the top of the pan, and a vacuum connection and release valve are provided. An hydraulic thermostat controls the water bath temperature up to 70°C, and a mercury in glass thermometer is provided.

The double pan model is as above but has two pans mounted side by side in the water bath.

HJ-245

BATH, VACUUM EMBEDDING, as specification, with **single pan** 19 cm diameter. For 230/250V 50 Hz single phase supplies. Loading 250W. Overall dimensions 36 × 28 × 30 cm. Weight 12 kg ... ... Each **£48·00** *fxN*

HJ-250

BATH, VACUUM EMBEDDING, as specification, with **double pan** each 19 cm diameter. For 230/250V 50 Hz single phase supplies. Loading 250W. Overall dimensions 36 × 48 × 28 cm. Weight 22 kg.
Each **£80·00** *fxN*

REPLACEMENT PARTS

HJ-252	**Sealing washer,** for above baths ...	Each	£0·40	*fxN*
HJ-254	**Glass cover,** without needle valve ...	Each	£2·75	*fxN*

HJ-245

MICROTOMES

MR-600	**Rocking microtome** for cutting paraffin embedded comparatively soft tissues and for use as a freezing microtome.
MR-661	**Rotary rocking microtome** for cutting practically flat sections.

For details and prices see entries in List No. sequence.

STAINING ACCESSORIES

*HJ-300

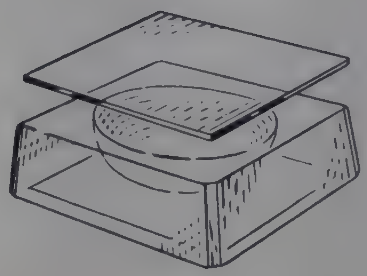
STAINING BLOCK, glass, with cavity 30 mm dia. 10 mm deep. Complete with flat glass cover 37 mm square to minimise evaporation.

Ten **£2·20** Each **£0·29** *cx*

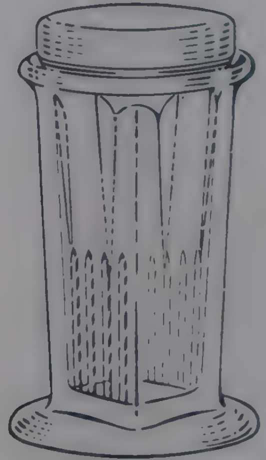
HJ-320

STAINING JAR, Coplin, borosilicate glass, with loose fitting cover, to take ten microscope slides, 75×25 mm, in pairs back to back.

Ten **£6·80** Each **£0·76** *cx*



HJ-300



HJ-320

HJ-330

STAINING JAR, Wilson, polypropylene, with screw-on lid giving liquid tight seal and taking ten microscope slides, 75×25 mm, back to back. Particularly suitable for staining blood smears and for use with stains in volatile solvents.

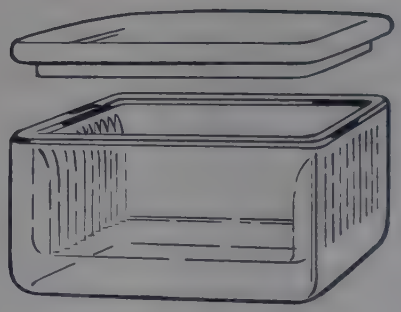
Ten **£2·30** Each **£0·30** *mx*

HJ-350

STAINING TROUGH, borosilicate glass, with loose fitting cover, to take twenty microscope slides, 75×25 mm, back to back.

Ten **£8·60** Each **£0·96** *cx*

HJ-330



HJ-350

*HJ-390

STAINING TROUGH, glass, with loose fitting cover. To take grooved tray HJ-400. Dimensions 83×103×72 mm high.

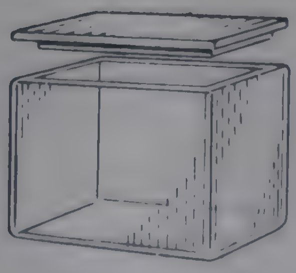
Ten **£21·00** Each **£2·35** *cx*

*HJ-400

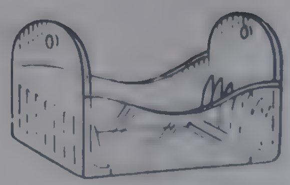
STAINING TRAY, glass, with ten grooves to take twenty microscope slides, 75×25 mm, back to back, and fitting into staining trough HJ-390. Suitable for batch staining procedure, where sections can be immersed in successive reagents without any handling of slides.

Ten **£16·50** Each **£1·85** *cx*

HJ-402 **Wire handle,** for lifting tray HJ-400 into and out of trough HJ-390 ... Ten **£1·10** Each **£0·18** *bx*



HJ-390

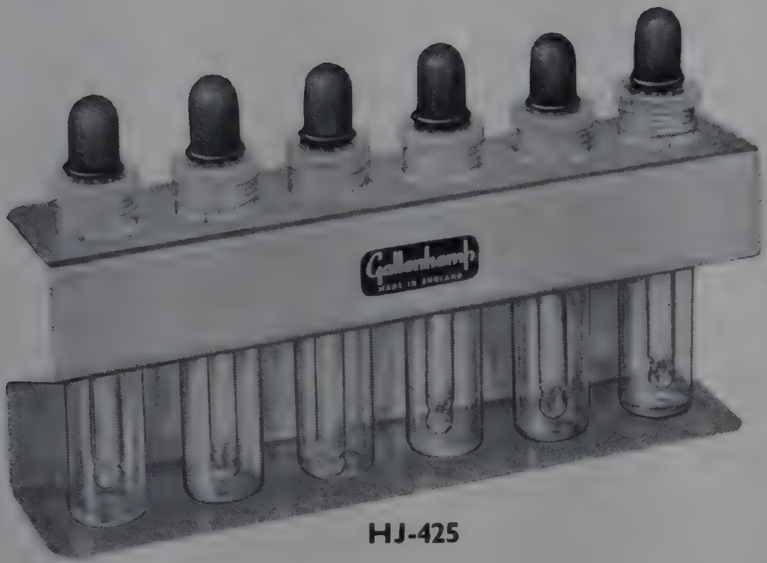


HJ-400

STAINING AND MOUNTING ACCESSORIES
(continued)

HJ-420 with rods

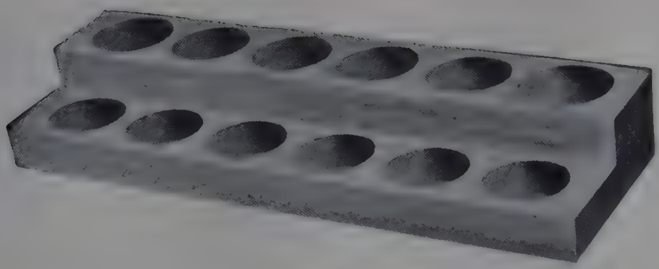
HJ-420
STAINING RACK, for slides, *Gallenkamp*, for use over laboratory sinks. Comprises two brass blocks drilled to take two glass rods to span sink and support microscope slides. Each block has milled head screws for clamping glass rod and levelling screws for gently rocking staining fluid or sections. **Without glass rods.** Pair **£2·60** *bx*



HJ-425

HJ-425
STAINING BOTTLE RACK, comprising stainless steel stand and 6×15 ml glass tubes with dropping pipettes. Each **£2·20** *cx*

REPLACEMENT PART
HJ-428 **Tube,** 15 ml, glass with dropping pipette. Set of 6 **£0·90** *cx*



HJ-450

HJ-450
STAINING BOTTLE STAND, polished hardwood, for twelve dropping bottles, size 30 ml. Ten **£16·50** Each **£1·85** *cx*

Dropping bottles for stains see BT-550 *et seq.* in List No. sequence.

Trays for protecting bench tops from spilt stains, see BT-640 in List No. sequence.

HJ-500
CANADA BALSAM BOTTLE, glass, with loose fitting glass cap and solid glass dropper. Capacity 30 ml. Each **£0·39** *mx*

***HJ-520**
IMMERSION OIL, a non-drying oil with refractive index $n_D^{25°C}$ 1·5150 and very low fluorescent properties. Suitable for oil immersion lenses and as a transparent mounting medium. Supplied in bottle containing 1 fl. oz (approx. 28 ml) ... ... Each **£0·70** *cx*

HJ-550
FORCEPS, nickel plated, with spatulate ends, for manipulating slides and cover glasses. Ten **£4·10** Each **£0·46** *cx*

HJ-500

HJ-550

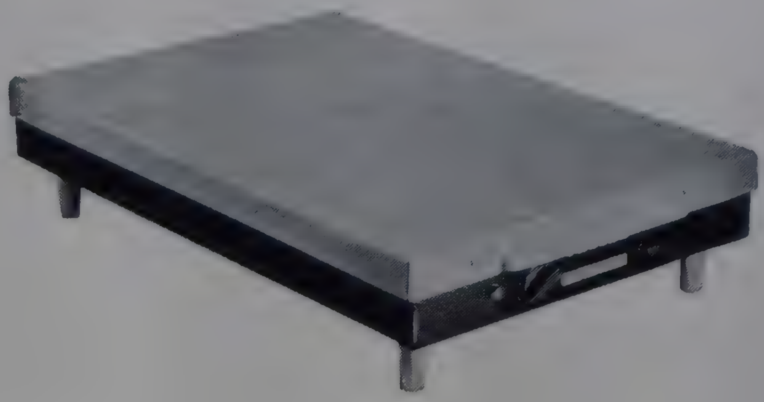
STAGE GRATICULES, mounted on 75×25 mm slides —see MP-770 to MP-780

COUNTING CELLS Sedgewick Rafter—see MP-785
McMaster —see MP-790

For details and prices see entries in List No. sequence.

HJ-620

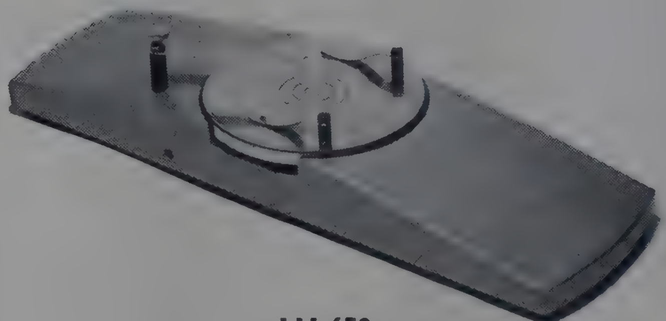
SLIDE DRYING PLATE, electrically heated, with a smooth enamelled steel top, dimensions 39·5×26·5 cm. With thermostat giving temperature control up to approximately 60°C and accurate to ±1·0degC. Power rating 150W. For 220/250V a.c. supplies. With indicator lamp and length of 3-core cable... ... Each **£6·30** *mx*



HJ-620

HJ-650

RINGING TURNTABLE, for making microscope slide preparations with asphaltum varnish. Comprises brass table rotating on a ball bearing fitting, with hand rests on both sides and an adjustable arm for steadying the brush. Each **£12·80** *mx*



HJ-650

INCUBATORS for drying microscope slides — see IH-100 and IH-150 in List No. sequence.

SLIDES

***HJ-700**

SLIDES, MICROSCOPE, 75×25 mm, plain cut edges. Thickness approx. 1 mm. In box of 50.
10 boxes **£5·80** Box **£0·64** *cx*

HJ-715

SLIDES, MICROSCOPE, *Chance Propper*, 75×25 mm, edges finely ground. Washed and cleaned ready for use. In boxes of 50.

Thickness	0·8/1·0	1·0/1·2	1·2/1·5 mm	
10 boxes	**£3·00**	**2·70**	**2·70**	*mx*
Box	**£0·36**	**0·33**	**0·33**	

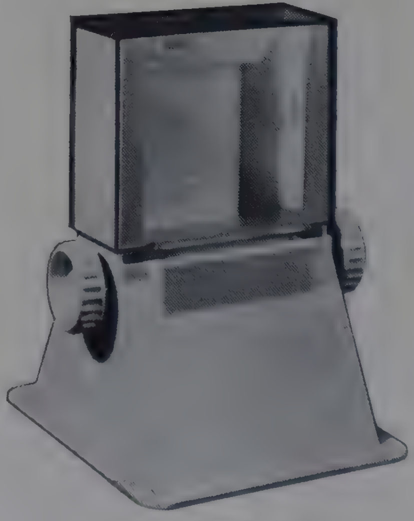
HJ-725

SLIDES, MICROSCOPE, *Chance Propper*, 75×25 mm, as HJ-715 but with 20 mm frosted end for writing. In boxes of 50.

Thickness	0·8/1·0	1·0/1·2 mm	
10 boxes	**£5·00**	**4·70**	*mx*
Box	**£0·56**	**0·52**	

***HJ-730**

SLIDE DISPENSER for 75×25 mm microscope slides. Comprises a moulded plastics base and slide container with a close fitting, moulded, transparent cover. The container has capacity for about sixty 1 mm thick slides. These rest on a roller which may be turned, by means of knurled knobs on either side of the dispenser, to deliver one slide at a time through a slot. Until each slide has been removed, the next slide cannot be dispensed. Dimensions 10×12×14 cm high ... Each **£2·30** *mx*



HJ-730

***HJ-745**

SLIDES, MICROSCOPE, edges finely ground, for large sections. Thickness 1·2/1·5 mm. In boxes of 50.

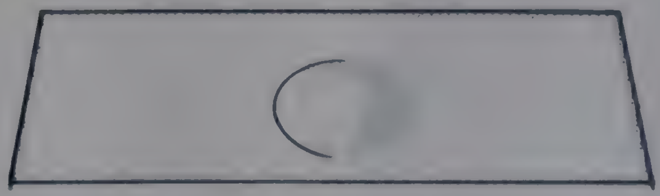
Dimensions	75×38	75×50 mm	
10 boxes	**£10·00**	**12·00**	*mx*
Box	**£ 1·12**	**1·35**	

HJ-755

SLIDES, MICROSCOPE, 75×25 mm, edges ground and polished, with cavities for hanging drop techniques. In boxes of 10.

Thickness 1·2/1·5 mm

No. of cavities	1	2	
10 boxes	**£7·80**	**12·00**	*mx*
Box	**£0·88**	**1·35**	



HJ-755 one cavity

COVER GLASSES AND CELLS

COVER GLASSES, *Chance Propper*, resistance glass, **circular shape.** In boxes of 100.

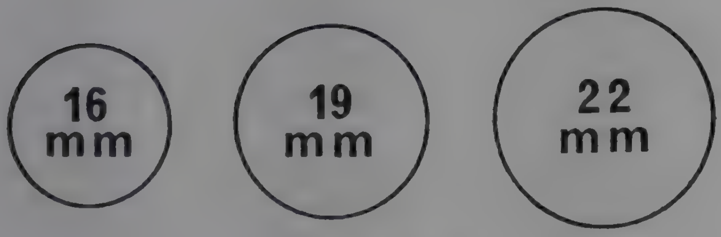
List No.	Thickness No.	Thickness mm	Diam. mm	100 boxes	10 boxes	Box	
				£	£	£	
HJ-760	3	0·25–0·35	16	**28·00**	**3·10**	**0·37**	*mx*
			19	**36·00**	**3·90**	**0·45**	*mx*
			22	**41·00**	**4·50**	**0·50**	*mx*
HJ-761	1½	0·16–0·19	16	**24·00**	**2·60**	**0·32**	*mx*
			19	**29·00**	**3·20**	**0·38**	*mx*
			22	**36·00**	**3·90**	**0·45**	*mx*
HJ-762	0	0·09–0·13	13	**30·00**	**3·30**	**0·39**	*mx*
			16	**28·00**	**3·10**	**0·37**	*mx*
			19	**36·00**	**3·90**	**0·45**	*mx*
			22	**41·00**	**4·50**	**0·50**	*mx*

When ordering please state size required.

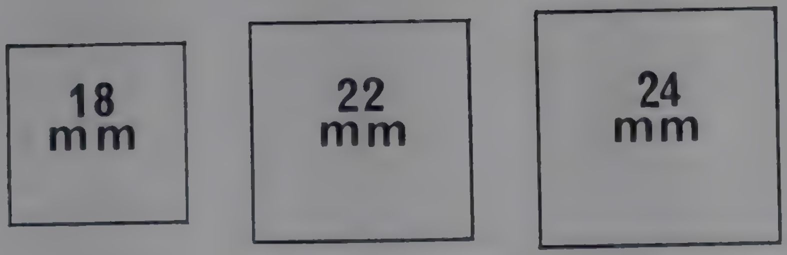
COVER GLASSES, *Chance Propper*, resistance glass, **square shape.** In boxes of 100.

List No.	Thickness No.	Thickness mm	Square size mm	100 boxes	10 boxes	Box	
				£	£	£	
HJ-770	3	0·25–0·35	18	**21·00**	**2·30**	**0·29**	*mx*
			22	**30·00**	**3·30**	**0·39**	*mx*
			24	**36·00**	**3·90**	**0·45**	*mx*
HJ-771	1½	0·16–0·19	18	**18·50**	**2·00**	**0·26**	*mx*
			22	**26·50**	**2·90**	**0·35**	*mx*
			24	**30·00**	**3·30**	**0·39**	*mx*
HJ-772	0	0·09–0·13	18	**21·00**	**2·30**	**0·29**	*mx*
			22	**30·00**	**3·30**	**0·39**	*mx*
			24	**36·00**	**3·90**	**0·45**	*mx*

When ordering please state size required.



HJ-760 to HJ-762
Full size outlines



HJ-770 to HJ-772
Full size outlines

HJ-780

COVER GLASSES, *Chance Propper*, resistance glass, **rectangular shape** No. 1½, 0·16–0·19 mm thick. In boxes of 100.

Dimensions	22×26	22×32	22×40	22×50 mm	
100 boxes	**£30·00**	**40·00**	**50·00**	**64·00**	*mx*
10 boxes	**£ 3·30**	**4·40**	**5·50**	**7·00**	
Box	**£ 0·39**	**0·49**	**0·62**	**0·78**	

When ordering please state size required.

HJ-810

GLASS RING CELLS, Ⓐ, for mounting thick specimens such as foraminifera, insect wings, etc. on microscope slides. May also be used for observing Brownian movement. In packs of 10.

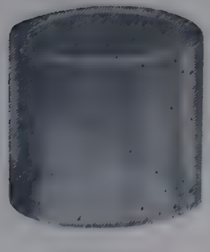
Depth	3	5	7	15 mm	
Dia.	15	18	20	20 mm	
Pack	**£0·85**	**0·85**	**0·85**	**0·85**	*ax*

HJ-833

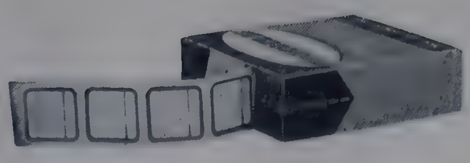
LABELS, self-adhesive white, 22 mm square, ruled 4 lines and black border. In dispensing carton containing 500 labels ... ... Carton **£0·70** *cx*

For other types of labels see **LABELS.**

Pencils for writing on glass microscope slides see PC-910 and PC-940 in List No. sequence.



HJ-810



HJ-833

SLIDE STORAGE

For 75 × 25 mm slides.

HJ-850

MICROSCOPE SLIDE HOLDER, *Gallenkamp*, aluminium, to take four slides. This holder is designed for storing microscopical preparations in cabinet HJ-860 or other standard filing cabinet for 125 × 75 mm cards. Supplied in pack of 25.

10 packs **£12·00** Pack **£1·35** *bx*

HJ-860

MICROSCOPE SLIDE CABINET, metal, with two drawers, side-by-side, sliding on polythene runners, each drawer taking 100 aluminium slide holders HJ-850. Total accommodation 800 slides. Designed to stack one on another, each cabinet is fitted with rubber feet and a set of nuts and bolts for fixing. Dimensions 14 × 35 × 40 cm. With 200 slide holders HJ-850.

Each **£19·50** *bx*

HJ-902

MICROSCOPE SLIDE FOLDER, with hinged flaps, numbered positions, to hold twenty slides.

Ten **£3·80** Each **£0·44** *cx*

HJ-910

MICROSCOPE SLIDE BOX, pasteboard. To hold 12 slides ... ... Ten **£2·40** Each **£0·30** *cx*

HJ-920

MICROSCOPE SLIDE BOX, imitation leather covered, with hinged lid and metal clasps. Two compartments to take a total of 100 slides.

Ten **£13·80** Each **£1·55** *cx*

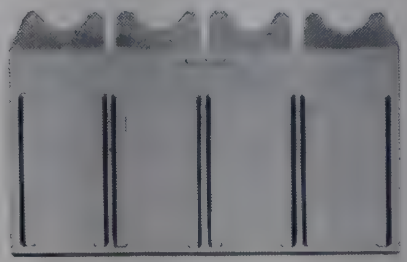
HJ-930

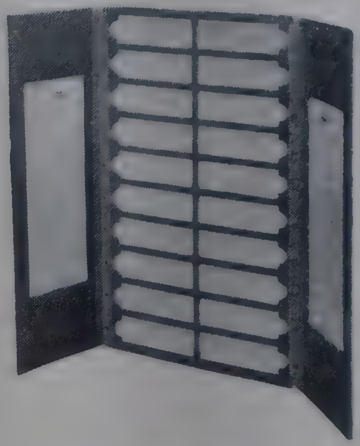
MICROSCOPE SLIDE CABINET, cardboard, covered imitation leather. With drop front and 12 loose trays each holding nine slides providing accommodation for 108 slides ... ... Ten **£14·60** Each **£1·65** *cx*

HJ-950

MICROSCOPE SLIDE CABINETS, metal, with drawers, 3·3 × 29 × 41 cm deep divided into three compartments by fixed slotted divisions. Each drawer accommodates 300 slides.

No. of drawers	7	21	
To hold	2100	6300 slides	
Overall height	31	100 cm	
Each	**£17·35**	**47·25**	*fx*


HJ-850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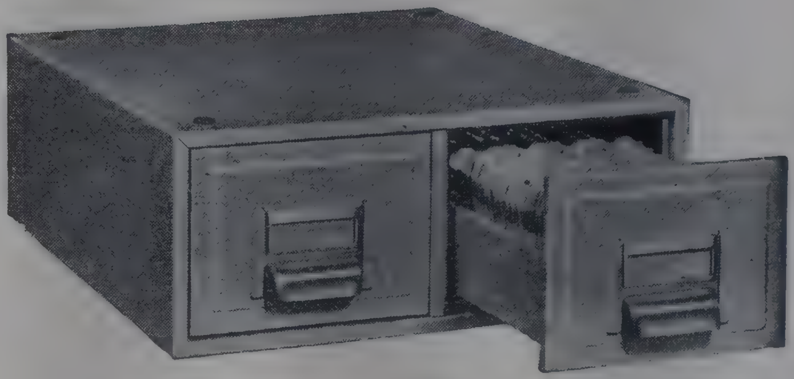
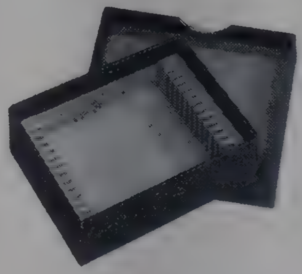
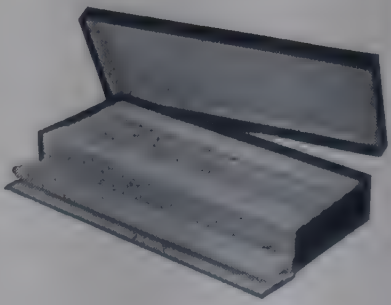

HJ-860


HJ-910

HJ-920


HJ-930

HJ-950

Gallenkamp LABORATORY HOTPLATES

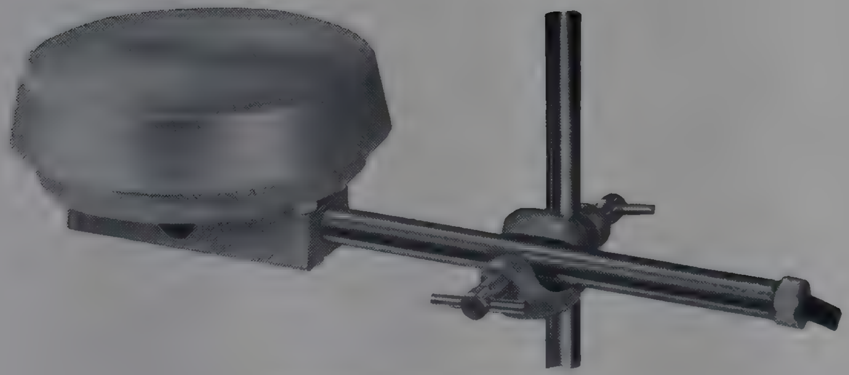
- **Models available to provide surface temperatures up to 550°C**
- **Built-in thermostat or energy regulator on some models**
- **Choice of circular or rectangular plates**

Plates other than on HL-010 are cast iron, and aluminium sprayed to resist corrosion. HL-010 has an aluminium alloy plate.

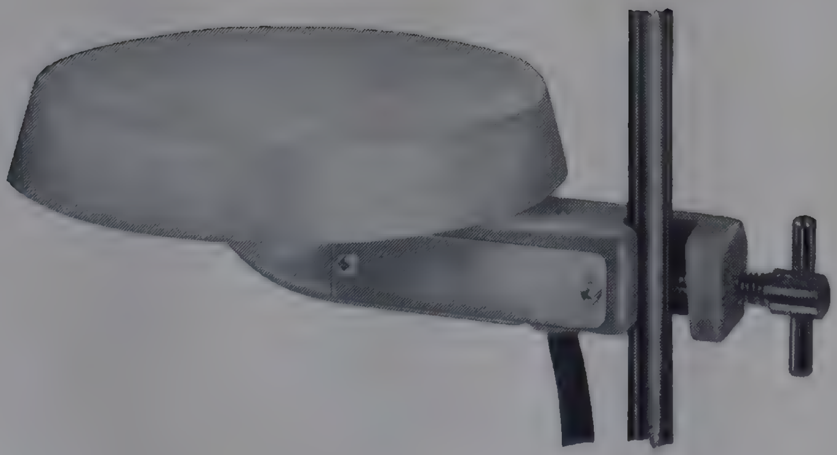
Energy regulators have arbitrary scales and control power input and consequently the hotplate temperature by periodically switching on and off the electricity supply.

Thermostats are hydraulic with direct reading scales. Surface temperature fluctuation of the plate is maintained at about 5degC.

RETORT STAND MOUNTING



HL-010 with bosshead



HL-025

HOTPLATES, *Gallenkamp,* **circular, retort stand mounting,** supplied with mains lead but without controls. HL-010 has an aluminium alloy plate. HL-025 has an integral fixed length retort stand mounting clamp giving a centre to centre distance of approximately 10 cm.

For 220/240V a.c. single phase supplies.

List No.	Dia. cm	Max. temp. °C	Power rating W	Weight kg	Each	
HL-010	12·5	350	350	1·3	£ **9·20**	*bx*
HL-025	15	550	750	2	**14·00**	*bx*

Available for other voltages to order.

REPLACEMENT PARTS

HL-016	**Element, 350W, for HL-010**	Each	**£1·30**	*bx*
HL-026	**Element, 750W, for HL-025**	Each	**£2·60**	*bx*

When ordering hotplates or replacement elements please state voltage of electricity supply.

ACCESSORIES

EC-810	**Power controller,** in-line ...	For details and prices see entries in List No. sequence.
SM-430 et seq.	**Retort rods and stands** ...	
SM-610	**Bosshead,** for use with HL-010 ...	

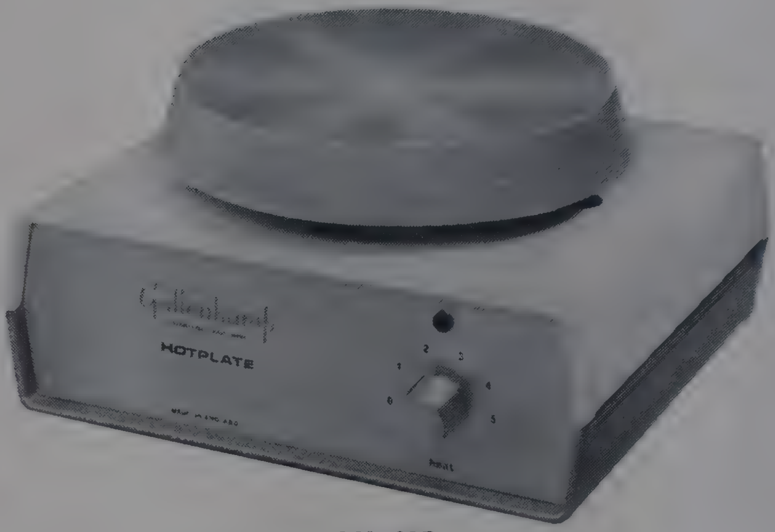
Gallenkamp LABORATORY HOTPLATES

BENCH STANDING

HOTPLATES, *Gallenkamp,* **circular, bench standing,** supplied with mains lead. Plate dia. 15 cm. Overall dimensions 13H × 21W × 19D cm. Weight 2·4 kg. Power rating 750W. For 220/240V a.c. single phase supplies.

List No.	Control	Max. temp. °C	Each	
			£	
HL-035	Energy regulator	550	**20·00**	*bx*
HL-037	Thermostat	275	**21·00**	*bx*

Available for other voltages to order.



HL-035
(HL-037 is similar)

REPLACEMENT PART

HL-039 **Element,** 750W, for HL-035 and HL-037. Each **£4·20** *bx*

HOTPLATES, *Gallenkamp,* **rectangular, bench standing,** supplied with mains lead. Plate dimensions 49 × 27 cm. Overall dimensions 49 × 30 × 17 cm high. Weight 18 kg. Power rating 2kW. For 220/240V a.c. single phase supplies.

List No.	Control	Max. temp. °C	Each	
			£	
HL-052	Energy regulator	400	**52·50**	*bx*
HL-054	Thermostat	275	**54·50**	*bx*

Available for other voltages to order.

HL-054 with hobs HL-055
(HL-052 is similar)

ACCESSORY

HL-055 **Hob, stainless steel,** 49 × 10 cm, for rectangular hotplates. Provide useful extension to the working surface for simmering. One or two may be fitted. Each **£5·40** *bx*

REPLACEMENT PART

HL-056 **Element,** 2000W, for HL-052 and HL-054. Each **£8·60** *bx*

When ordering hotplates or replacement elements please state voltage of electricity supply.

SURFACE TEMPERATURE MEASUREMENT

TJ-830	Temperature indicating strips.
TJ-990	Surface contact dial thermometer.

For details and prices see entries in List No. sequence.

Gallenkamp

MAGNETIC STIRRER HOTPLATES

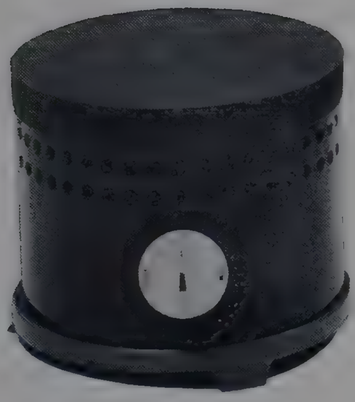
- **Thermostat or energy regulator control of temperature**
- **Variable speed stirring**

For details and prices see SS-670 et seq. in List No. sequence.

HOTPLATES

(continued)

HL-085



HL-087

HL-090

HL-110

HL-085

HOTPLATE, electrically heated, 20 cm dia. top, 17 cm high, 2 kW loading. Maximum surface temperature about 500°C. With ventilated case, vitreous enamel finish. Weight 5 kg. Fitted with energy regulator control. For 230/250V a.c. single phase supplies Each **£7·70** *mx*

HL-087

HOTPLATE, as HL-085 but fitted with 3-heat switch for 230/250V a.c. single phase or d.c. supplies. Each **£8·00** *mx*

HL-090

HOTPLATE, rectangular, electrically heated, with 2 kW heated plate 22×15 cm set into the metal top surface. Maximum surface temperature about 500°C. Overall dimensions 40×21×15 cm high. Weight 7 kg. Fitted with energy regulator control. For 230/250V a.c. single phase supplies only ... ... Each **£11·00** *mx*

HL-110

HOTPLATES, rectangular, electrically heated, cast-iron top plate, stainless steel body. Maximum surface temperature about 350°C. Fitted with energy regulator control. For 220/240V a.c. single phase supplies.

Power rating	1	2	3	kW
Plate size	30×23	46×30	69×30	cm
No. of elements	1	2	3	
Weight, approx.	10	21	29	kg
Each	**£34·50**	**41·50**	**65·50**	*mx*

REPLACEMENT PART

HL-114 Heating element, 1 kW ... ... Each **£3·50** *mx*

All above hotplates are available for other voltages to order. When ordering please state voltage of electricity supply.

RADIANT HEATER	see **HD-230**
INFRARED HEATER	see **HD-262**
ELECTRIC 'BUNSEN' HEATER	see **HE-400**
LOW TEMPERATURE HOTPLATE	see **HJ-620**

For details and prices see entries in List No. sequence.

Gallenkamp HYDROGENATION APPARATUS

REGD TRADE MARK

For measuring the hydrogen uptake of organic materials at atmospheric pressures

For hydrogenations using 3 to 5 mg samples

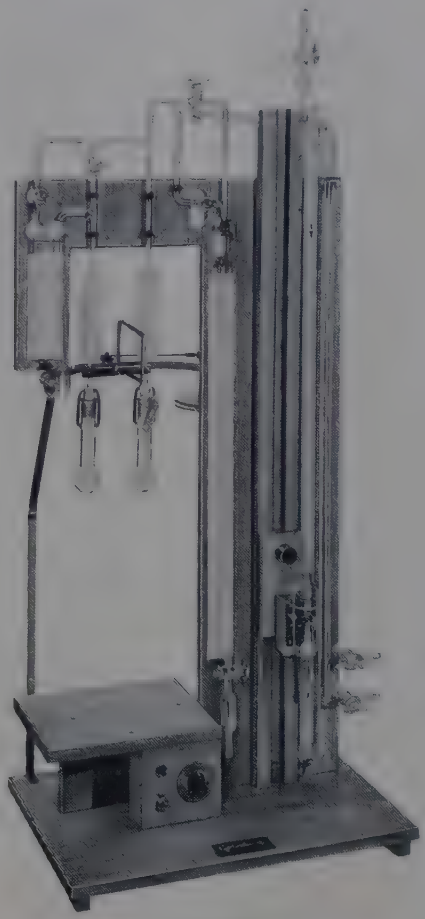
A robust apparatus with interchangeable ground glass joints. Includes a reaction flask with rotating sidearm for the simple introduction of sample and a compensating flask, both flasks being efficiently shaken by motor driven eccentric. For high accuracy work the flasks should be submersed in the unheated water bath HR-112. The gas burette has an approximate capacity of 5 cm³. Overall dimensions 55 × 36 × 120 cm high. Requires approximately 3 kg mercury.

HR-100

HYDROGENATION APPARATUS, 5 mg, *Gallenkamp*, as specification, with instructions manual, but **without mercury or water bath** ... Each **£144·00** *bx*

ACCESSORIES

HR-112	**Water bath,** with adjustable stand ...	Each **£18·50***bxN*
MF-932	**Mercury,** triple distilled. For details and prices see entry in List No. sequence.	



HR-100

For hydrogenations using 0·5 to 5 g samples

A robust apparatus, ideal for educational purposes, with flexible clear PVC joints. Includes independent systems for two simultaneous hydrogenations on the one apparatus. The samples may be agitated either by magnetic stirring or by using a flask shaker. Gas burettes with capacity either 100 cm³ or 500 cm³ may be used and **only water is required as the displacing medium.** Overall dimensions 31 × 61 × 105 cm high. Requires approximately 1·5 kg mercury.

HR-160

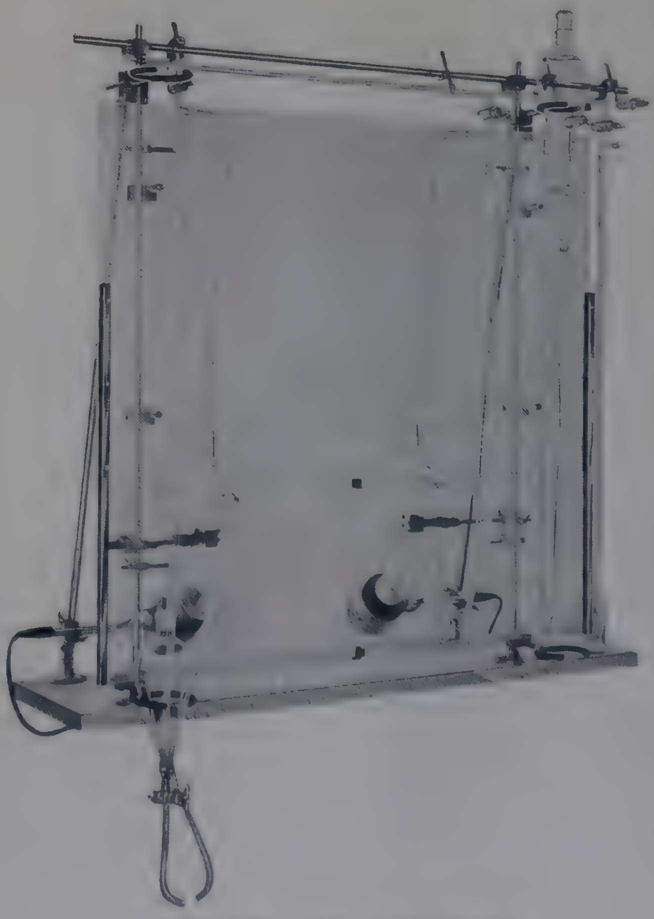
HYDROGENATION APPARATUS, 5 g, *Gallenkamp*, as specification with Perspex safety screen and fitted with one 100 cm³ and one 500 cm³ burette. Includes instructions manual but **without mercury, stirrers or shakers** ... ... Each **£96·00** *bx*

REPLACEMENT PARTS

HR-164	**Burette,** 100 cm³	Each	**£3·65** *ax*
HR-166	**Burette,** 500 cm³	Each	**£4·10** *ax*
HR-178	**Reaction flask,** with side mounted tap funnel and 29/32 socket	Each	**£4·10** *ax*
HR-186	**Water reservoir**	Each	**£2·70** *ax*
TX-774	**Tubing,** PVC, transparent, 8 mm bore.	For price see entry in List No. sequence.	

ACCESSORIES

SS-425 **SS-444** **SS-636**	**Handilab stirrer,** *Gallenkamp*, with magnetic stirring rotor and polypropylene covered magnetised follower 12 mm. (Two assemblies required) ...	For details and prices see entries in List No. sequence.
SD-110	**Shaker**	
MF-932	**Mercury,** triple distilled	



HR-160 with accessories

HYDROGEN-ION (pH) DETERMINATION

ALL APPARATUS FOR THIS PURPOSE IS LISTED UNDER

ELECTROCHEMICAL APPARATUS

SPECIFIC GRAVITY HYDROMETERS

Calibrated at 60°F

HT-205

HYDROMETER, shot weighted, covering range 0·70 to 2·00, subdivided in 0·01. Overall length approx. 38 cm.
Each **£1·24** *mx*

HT-225

HYDROMETERS, shot weighted, covering ranges indicated. Subdivided in 0·005. Overall length approx. 25 cm.

Range			
	0·70	1·00	1·50
	1·00	1·50	2·00

Each (all ranges) **£0·75** *mx*

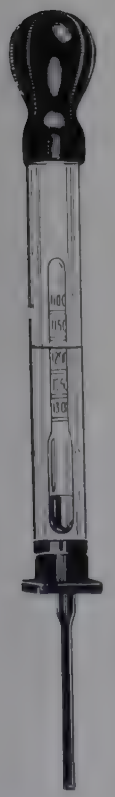
HT-245

HYDROMETERS, two hundred degree series, shot weighted. Ranges subdivided in 0·002. Overall length approx. 25 cm. Range 0·80 to 1·00 adjusted for low surface tension. Ranges 1·00 to 2·00 adjusted for medium surface tension.

Range						
	0·80	1·00	1·20	1·40	1·60	1·80
	1·00	1·20	1·40	1·60	1·80	2·00

Each (all ranges) **£0·75** *mx*

HT-205 to HT-320



HT-340

HT-500

HT-520

HT-265

HYDROMETERS, to BS 718 Series M100, shot weighted. Ranges subdivided in 0·002. Overall length approx. 25 cm. Ranges 0·60 to 1·00 adjusted for low surface tension. Ranges 1·00 to 1·30 adjusted for medium surface tension.

Range							
	0·60	0·70	0·80	0·90	1·00	1·10	1·20
	0·70	0·80	0·90	1·00	1·10	1·20	1·30

Each (all ranges) **£0·70** *mx*

HT-285

HYDROMETERS, to BS 718 Series S50, shot weighted. Ranges subdivided in 0·002. Overall length approx. 25 cm. Ranges 0·60 to 1·00 adjusted for low surface tension. Ranges 1·00 to 1·65 adjusted for medium surface tension.

Range	0·60	0·65	0·70	0·75	0·80	0·85	0·90
	0·65	0·70	0·75	0·80	0·85	0·90	0·95
Range	0·95	1·00	1·05	1·10	1·15	1·20	1·25
	1·00	1·05	1·10	1·15	1·20	1·25	1·30
Range	1·30	1·35	1·40	1·45	1·50	1·55	1·60
	1·35	1·40	1·45	1·50	1·55	1·60	1·65

Each (all ranges) **£0·65** *mx*

SPECIAL PURPOSE HYDROMETERS

HT-320

HYDROMETERS, Twaddell, shot weighted, overall length approx. 16 cm.
Conversion: Specific gravity=(°Tw×0·005)+1·000.

Range °Tw					
	0	24	48	74	102
	24	48	74	102	138

Each (all ranges) **£0·57** *mx*

HT-340

HYDROMETER, accumulator, syringe type. Comprising transparent plastics syringe with suction bulb, delivery tube and shot-weighted hydrometer float, range 1·10 to 1·30 ... Ten **£5·20** Each **£0·58** *cx*

HYDROMETER TRIAL JARS

HT-500

HYDROMETER TRIAL JARS, glass with spout.

Height	15	20	25	30	30	35	45 cm	
Diameter	4	5	5	5	8	5	5 cm	
Ten	**£2·80**	**3·60**	**3·80**	**4·40**	**8·00**	**5·00**	**7·40**	*cx*
Each	**£0·34**	**0·42**	**0·44**	**0·49**	**0·90**	**0·55**	**0·82**	

HT-520

HYDROMETER TRIAL JAR, polythene, with overflow well at the top. Overall height 30 cm, dia. 5·5 cm.
Each **£2·50** *cx*

HYDROMETERS for:

Milk testing	see DC-900
Soil testing	see SH-161 et seq.
Water testing	see WR-250 et seq.

DENSITY BOTTLES and PYKNOMETER TUBES
see DJ-530 et seq.

For details and prices see entries in List No. sequence.

HYGROMETERS

DEW POINT

HV-010

HYGROMETER, Regnault, dew point, comprises a glass tube fitted with chromium plated copper thimble, rubber stopper and glass air tubes. **Without thermometer** ... ... Each **£2·85** *ax*

ACCESSORIES

TJ-174 **Thermometer,** range −20 to +60°C. For details and price see entry in List No. sequence.

HV-040

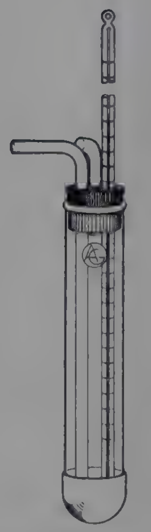
HYGROMETER, dew point, for use with 10 ml samples or, for higher accuracy, with a continuous stream of gas. The sample chamber is separated from the ether vessel by a thin, polished stainless steel mirror upon which the dew forms. The bulb of the 12·5 cm scale, insulated stem thermometer is placed adjacent to the mirror. Ether is evaporated by bubbling air through it from a rubber aspirator, a constriction in the pipe giving close control of the cooling rate. With thermometer −15 to +35°C in 0·5degC ... ... Each **£14·00** *fx*

ACCESSORIES AND REPLACEMENTS

HV-042 **Thermometers,** insulated pattern, with 12·5 cm scale.

Range	0 to 90°F	−15 to +35°C	
Subdivision	1degF	0·5degC	
Each	**£2·50**	**2·50**	*fx*

HV-044 **Rubber aspirator,** for evaporating ether. Each **£1·00** *fx*



HV-010
with thermometer

HV-040

DEW POINT METER

A self-contained instrument for determining the dew point of gaseous samples down to −60°C. The sample, compressed to a known pressure, is made to expand adiabatically to atmospheric pressure, and the ratio of sample pressure to atmospheric pressure noted on the direct reading 'Pressure Ratio' gauge. If the sample has cooled to below its dew point a mist is observed in the illuminated pressure chamber. At a particular 'pressure ratio' the mist will just vanish, and by noting this ratio and the initial temperature the dew point is determined using the calculator provided. The simplicity of operation ensures repeatable readings and an accuracy of ±1·5degC can be obtained.

HV-060

DEW POINT METER, as specification. With hand pump for gaseous samples having pressures not exceeding 3·5 kgf/cm², 'Pressure Ratio' gauge scaled 1·0 to 0·25, initial temperature thermometer, sample inlet and outlet nozzles, purging valve, glass fibre filter, spare gauge oil, battery and instructions for use. A recessed electrical socket and plug without cable are provided for 100/250V a.c. single phase supplies if mains operation is preferred. Each **£175·00** *fxN*

HV-060

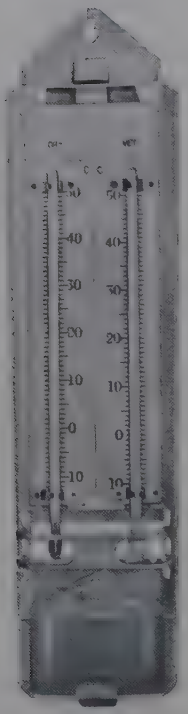
THERMOHYGROGRAPHS

Daily and weekly recording.
Range −10 to +40°C.
See TK-150 and TK-155 in List No. sequence.

Wet and Dry Bulb, Whirling, Assmann, Paper and Hair Hygrometers, see pages 370/371.

HYGROMETERS

(continued)



HV-100
HV-101
HV-110
HV-125

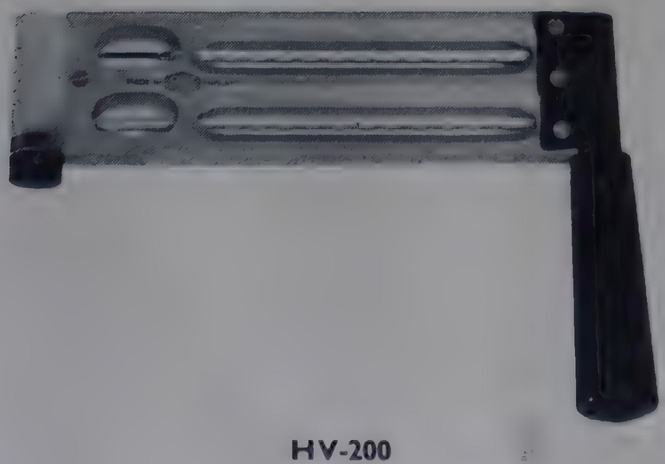
CALCULATING SLIDE RULES

for use with hygrometers.

See HV-570 and HV-572 in List No. sequence.

THERMOHYGROGRAPHS

For daily and weekly recording
see TK-150 et seq. in List No. sequence.



HV-200
HV-201

WET AND DRY BULB

HV-100

HYGROMETER, Mason, wet and dry bulb, to BS 2841 with two thermometers on polished zinc scale range 20 to 120°F in 1degF. In polypropylene frame with polythene reservoir and spare wicks ... Each **£3·00** *cx*

HV-101

HYGROMETER, Mason, as HV-100 but scaled —5 to 50°C in 0·5degC ... ... Each **£3·00** *cx*

REPLACEMENT PARTS

HV-102	**Wick,** cotton	Pack of 6	**£0·40**	*cx*
HV-104	**Reservoir,** polythene	Each	**£0·40**	*cx*

HV-110

HYGROMETER, Mason, wet and dry bulb, with two thermometers on polished zinc scale covering range 0 to 100°C in 1degC. In polypropylene frame with polythene reservoir and spare wicks ... Each **£6·70** *cx*

HV-125

HYGROMETER, Mason, wet and dry bulb. With two thermometers NPL accuracy covering range 0 to 50°C in 0·5degC for ambient humidity measurements. The thermometers are divided on the stems with subsidiary scales on an opal glass background. In polypropylene frame with wick and polythene reservoir.
Each **£9·40** *cx*

REPLACEMENT PARTS for HV-110 and HV-125

HV-102	**Wick,** cotton	For prices see entries in List No. sequence.
HV-104	**Reservoir,** polythene ...	

WHIRLING

HV-200

HYGROMETER, whirling, to BS 2842, with two lens front thermometers, scale length 10 cm, range 20 to 120°F in 1degF. The wooden frame has a plastics reservoir at one end into which the wick dips thus keeping the bulb continuously moistened. Complete with simple plastics slide rule ... ... Each **£5·50** *fx*

HV-201

HYGROMETER, whirling, as HV-200 but with thermometers of range —5 to 50°C in 0·5degC.
Each **£5·50** *fx*

ACCESSORIES AND REPLACEMENTS

HV-202 **Thermometers.**

Range	20 to 120°F	—5 to 50°C	
Each	**£1·20**	**1·20**	cx

HV-206	**Case,** for HV-200	Each	**£1·60**	*fx*
HV-208	**Wick,** cotton	Pack of 25	**£0·20**	*fx*
HV-252	**Conversion tables,** Fahrenheit	For details and prices see entries in List No. sequence.		
HV-254	**Conversion tables,** Centigrade			

HYGROMETERS

(continued)

ASPIRATED

HV-240

HYGROMETER, Assmann, British Meteorological Office pattern, with spring driven fan to keep the wet bulb ventilated until the equilibrium point is reached. This provides very accurate readings and the results may be used as standard for comparing other humidity measuring instruments. The bulbs of the two thermometers, range 20 to 120°F in 1degF, are screened from radiation by polished and plated tubes, enabling the instrument to be used even in bright sunlight. The thermometers are held in a metal frame on which the fan is mounted. The instrument is contained in a case and is supplied with wick, wick moistener, a suspension rod, and simple plastics slide rule ... ... Each **£75·00** *fxN*

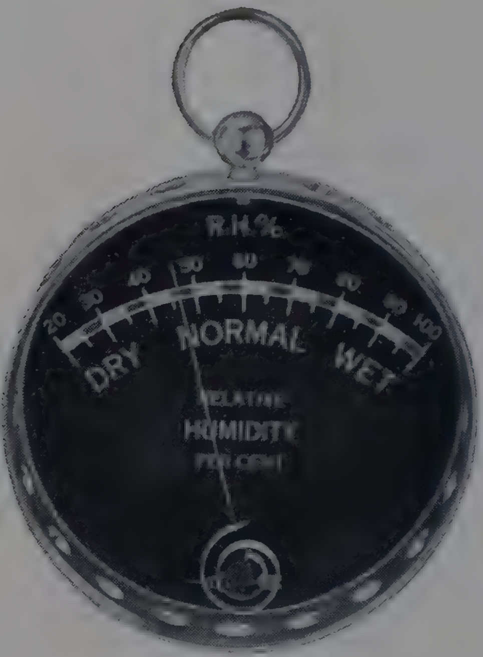
HV-240
HV-241

HV-241

HYGROMETER, Assmann, as HV-240 but with thermometers of range −5 to 50°C in 0·5degC. Each **£75·00** *fxN*

ACCESSORIES AND REPLACEMENTS

HV-242	**Thermometers.**			
	Range	20 to 120°F	—5 to 50°C	
	Each	**£3·00**	**3·00**	*fxN*
HV-246	**Wick,** cotton	Pack of 25	**£0·20**	*fx*
HV-252	**Tables,** for use with aspirated and whirling hygrometers for converting wet and dry bulb readings to relative humidity. For Fahrenheit thermometers.	Each	**£0·50**	*fz*
HV-254	**Tables,** as HV-252 but for use with Centigrade thermometers	Each	**£1·00**	*fz*



HV-400

PAPER and HAIR

HV-400

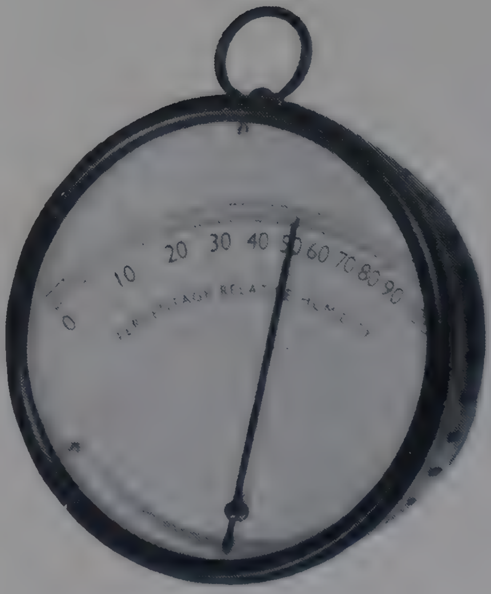
HYGROMETER, paper. In 7·5 cm dia. plastics case, with scale 20 to 100% r.h. subdivided every 5%. Each **£3·70** *mx*

HV-410

HYGROMETER, paper, as HV-400 but with bimetallic dial thermometer covering range 30 to 130°F. Each **£5·50** *mx*

HV-450

HYGROMETER, hair, range 0 to 100% r.h. In 10 cm dia. metal case with anodised dial ... Each **£7·80** *mx*



HV-450

CALCULATORS

HV-570

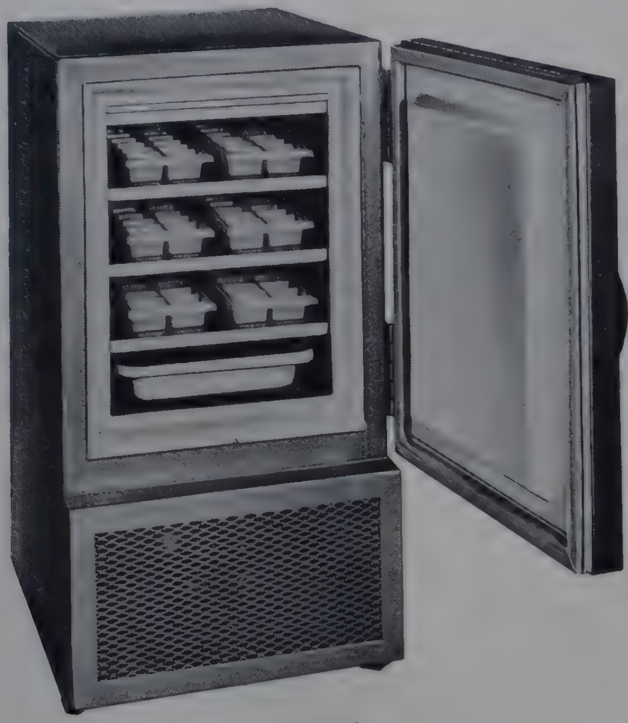
CALCULATOR, humidity slide rule, to British Meteorological Office design for the determination of relative humidity, dew point, frost point, vapour pressure and absolute humidity from psychrometric readings. Temperature range covered −130 to +110°F. The slider is scaled on one side for screen hygrometers and on the other for whirling and aspirated hygrometers. With case and instructions ... ... Each **£6·00** *fxN*

HV-570
HV-572

HV-572

CALCULATOR, as HV-570 but with temperature scale of −90 to +43°C ... ... Each **£6·00** *fxN*

ICE MAKING AND CRUSHING



IC-255

IC-255

ICE CUBE MAKER, with six ice trays to produce 84 ice cubes every 3½ hours. Total capacity approximately 20 litres. The refrigerating unit has a hermetically sealed system with a low consumption compressor. For 220/240V 50 Hz single phase supplies. Overall dimensions 64H × 35W × 44D cms. Weight 33 kg ... Each **£67·48** *fxN*

ICE FLAKE MAKING MACHINES, automatic, for production and storage of ice flakes. The quoted ice production rates are maxima and occur with water supply temperature of 10°C and an ambient temperature of 15°C. At higher temperatures the production is less. Storage bins have stainless steel liners. For 220/240V 50 Hz supplies.

	***IC-277**	***IC-282**	
Model No.	DF-4-6E	SF-75WSH	
Ice production	60 kg/24 hr	100 kg/24 hr	
Bin capacity	40 kg	45 kg	
Bin door	front opening	top sliding	
Compressor (air cooled)	$\frac{1}{5}$ hp	$\frac{1}{4}$ hp	
	H W D	H W D	
Overall dimensions	112 × 58 × 62	112 × 87 × 66 cm	
Net weight	98 kg	150 kg	
Each	**£415·00**	**549·40**	*fxN*

IC-282

REFRIGERATORS

Conservators	see RJ-890 et seq.
General purpose	see RJ-810 et seq.
Low temperature	see RJ-940
Under bench fitting	see FX-530

For details and prices see entries in List No. sequence.

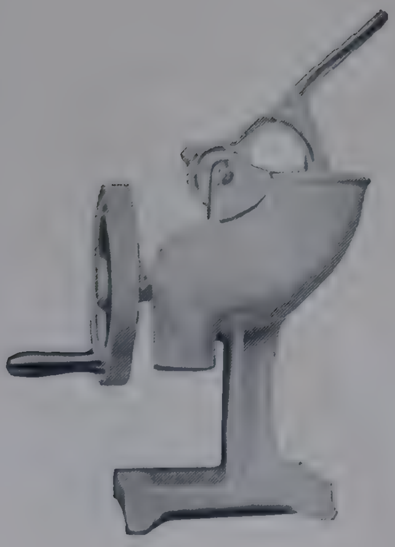
IC-320

ICE SHAVING MACHINE, hand operated, for reducing ice lumps to a fine powder. Comprises 10 cm dia. aluminium alloy hopper, with stainless steel rotating cutting blades, mounted on a base 23 × 13 cm. Capacity 7 kg ... ... Each **£47·00** *mx*

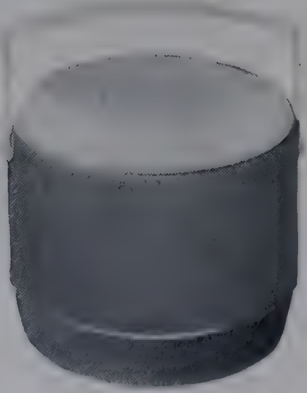
IC-335

ICE STORAGE CONTAINER, double walled, with polythene liner and polystyrene outer case and lid with handle. Internal dimensions approx. 18 cm dia. × 14 cm deep. Nominal capacity 3 litres.

Ten **£14·00** Each **£1·55** *mx*



IC-320



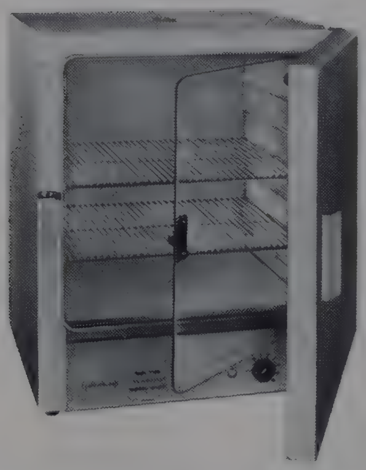
IC-335

Gallenkamp INCUBATORS

REGD TRADE MARK

The following pages describe a range of *Gallenkamp* incubators suitable for use in bacteriology, microbiology, virology, enzymology, pathology and other biological sciences.

Fan convection incubator



Gravity convection incubator

Orbital incubator

FAN CONVECTION INCUBATORS

		page
IH-100	High quality, general purpose model in three sizes with solid state thermostatic control and stainless steel interior	374/375
IH-102	Version of IH-100 fitted with **time/temperature cycling facility** required for the bacteriological examination of water, etc.	374/375

GRAVITY CONVECTION INCUBATORS

IH-150	An economy model in two sizes with thermostatic control and aluminium interior	376

COOLED INCUBATORS

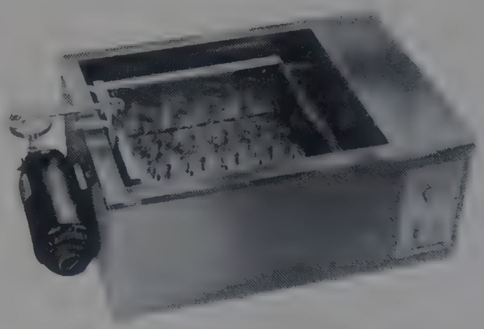
IH-275	Basic model with large capacity interior and solid state thermostatic control	377/378
IH-277	Version of IH-275 fitted with **time/temperature cycling facility** required for the bacteriological examination of water, etc. ...	378
IH-285	As basic model but fitted with **interior fluorescent illumination** suitable for studies in photosynthesis	379
IH-287	Version of IH-285 fitted with **time switch** to provide conditions of cyclic temperature and illumination	379
IH-295	As basic model but equipped for **incubations in CO_2/air mixtures**	380

SHAKING REACTION INCUBATORS

IH-350	High quality, stainless steel water bath, **capacity 15 litres,** with solid state temperature control	382
IH-370	High quality, stainless steel water bath, **capacity 70 litres,** with contact thermometer temperature control	383

ORBITAL INCUBATORS

IH-460	Basic model, large capacity stainless steel interior, **solid state control of speed and temperature**	384/385
IH-465	Version of IH-460 fitted **with refrigeration**	385
IH-490	Version of IH-460 but fitted with **refrigeration, fluorescent illumination and time switch** to provide temperature/illumination cycling facilities for studies in photosynthesis	386



Shaking reaction incubator

Cooled incubator

Gallenkamp

FAN CONVECTION MODELS

A range of high quality incubators, for use in the fields of biology and microbiology, bacteriology, virology, epidemiology, pathology and biochemistry.

Models available fitted with temperature/time cycling facility which meets requirement of the membrane filter technique for the examination of water supplies†

- **Temperature range 5degC above ambient to 100°C**
- **Direct reading *Compenstat* (solid state) temperature control with safety thermostat**
- **Stainless steel interior**
- **Toughened plate glass inner door with neoprene gasket**
- **Unitised control panel for easy servicing and recessed to minimise accidental alteration of controls**
- **No water jacket leakage hazard**

Gallenkamp
INCUBATOR

IH-100

DESIGN

Exterior. The exterior is finished in hard wearing light grey stoved enamel. The outer door has a rubber magnetic gasket and the inner glass door closes on a neoprene gasket.

Interior. Constructed from chemically resistant, semi-polished stainless steel to BS 971, EN 58B with fixed shelf runners and a removable baffle at the rear which guards the fan and heater.

Shelves. The grid steel wire shelves are electroplated with nickel and chromium.

Basket shelves with grid sides 7 cm high are available as optional extras. These are of similar construction and finish to the ordinary shelves and slide directly on to the shelf runners. They are convenient for pre-loading of small articles which can then be inserted quickly into the incubator with minimum heat loss.

Air circulation and heating. Air drawn from the centre of the incubator is recirculated to the top and bottom of the workspace by the rear mounted fan. The heater, which is sheathed in stainless steel, surrounds the fan and is screened from the workspace by the baffle.

Temperature controls. A direct reading *Compenstat* (solid state) maintains excellent and reliable temperature control. An independent safety thermostat, with warning lamp, is fitted.

Atmosphere control. An adjustable ventilator in the top of the incubator can be closed to shut off flow of outside air. This ventilator can also be lifted out to provide a 2·8 cm dia. port through which tubes may be fitted to feed gases other than air (e.g. CO_2, N_2, etc.) into the working space. The ventilator incorporates a clip to retain a mercury in glass thermometer.

Time cycling. A version of the incubator, IH-102, incorporates a time switch and a *Compenstat* (solid state) with two temperature setting controls, to give automatic switching between any two temperatures within the range of the incubator in addition to the usual constant temperature operation. The shortest time between switchings is 75 min. Cycles of 12 hrs or 24 hrs duration are readily obtainable and, by using the day omission dial, non-repetitive cycles of up to 7 days duration can be obtained.

TEMPERATURE RECORDER, range −10 to 110°C suitable for recording incubator temperatures—see TK-115 in List No. sequence.

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†References:

Bacteriological Examination of Water Supplies, HMSO Report 71, 1969.

Water Treatment and Examination, W. S. Holden, 1970.

INCUBATORS

FAN CONVECTION MODELS (continued)

PERFORMANCE

Data when tested according to BS 2648† methods.

Size No.		1	2	3
Temperature range		5degC above ambient to 100°C		
Temperature fluctuation	at 38°C	0·1	0·1	0·1degC
	at 60°C	0·1	0·1	0·1degC
Temperature variation	at 38°C	±0·25	±0·25	±0·5degC
	at 60°C	±0·5	±0·75	±1·0degC
Time to heat	to 38°C	15	25	20 min
	to 60°C	25	40	30 min
Recovery time after door opened one minute	at 38°C	6	6	6 min
	at 60°C	10	10	10 min

†Although British Standard 2648 is intended for testing unloaded drying ovens, the test methods form an excellent basis for comparing incubators.

DIMENSIONS

Size No.	1	2	3	
	H W D	H W D	H W D	
Internal	46×40×36	61×51×46	76×61×46	cm
Overall	81×58×68	96×68×79	112×79×79	cm
Shelves				
Size	38×34	48×44	58×44	cm
Number supplied	3	3	4	
Number of positions	4	5	6	
Interval between positions	11	11·5	12	cm
Max. shelf area	0·5	1·0	1·5	m²
Weight, net	55	77	93	kg
Power rating, max.	250	250	500	W

IH-100

INCUBATORS, *Gallenkamp*, **fan convection,** with direct reading *Compenstat* (solid state) thermostat, safety thermostat, stainless steel interior, toughened glass inner door, shelves, mains and load indicator lamps. **Without thermometer.** For single phase supplies.

Size No.	1	2	3	
For 220/240V 50 Hz	**£171·00**	**197·00**	**226·00**	*bx*
For 200/210V 50 Hz	**£174·00**	**200·00**	**229·00**	*bxN*
For 110/120V 60 Hz	**£174·00**	**200·00**	**229·00**	*bxN*

IH-102

INCUBATORS, *Gallenkamp*, **fan convection,** as IH-100 but incorporating time switch and dual control *Compenstat* (solid state) thermostat to give either constant temperature or cyclic temperature control. For single phase supplies.

Size No.	1	2	3	
For 220/240V 50 Hz	**£199·00**	**225·00**	**254·00**	*bx*
For 200/210V 50 Hz	**£202·00**	**228·00**	**257·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

IH-105 **Heaters.**

Incubator Size No.	1	2	3	
Each	**£2·50**	**2·50**	**2·50**	*bx*

OV-172 **Fan motor** ... ... } For prices see entries
OV-174 **Shelves** ... ... } in List No. sequence.

ACCESSORIES

IH-110 **Thermometer, red reflecting mercury, scale span 10 to 60°C in 1degC** ... ... Each **£1·45** *cx*

*__IH-112__ **Dial temperature indicator, range 0 to 110°C.** Each **£3·60** *bx*

OV-176 **Basket shelves** ... ... } For details see entries
OV-480 et seq. **Floor stands** ... ... } in List No. sequence.

Gallenkamp ECONOMY INCUBATORS

Economically priced incubators for use in schools and technical colleges.

GRAVITY CONVECTION MODELS

- **Temperature range 5degC above ambient to 80°C**
- **Aluminium interior**
- **Inner glass door**
- **Direct reading thermostat**

IH-150

CONSTRUCTION

The outer casing is of sheet steel finished in light grey enamel. The interior is of polished aluminium with fixed shelf positions. The walls and door are insulated with fibreglass, the outer door has a heat-break, and the inner glass door closes on to a neoprene gasket.

HEATING AND CONTROL

The heating elements are enclosed and covered by an aluminium plate and there are no electrical connections within the working space. A hydraulic thermostat with a scale calibrated in °C gives good temperature control. The control knob has an OFF position and a neon lamp indicates when the heaters are on.

PERFORMANCE

Size No.	1	2
Temperature range	5degC above ambient to 80°C	
Fluctuation at 38°C	0·5	0·5degC
Variation at 38°C	2	3degC

DIMENSIONS

Size No.	1	2	
	H W D	H W D	
Internal	33 × 48 × 33	47 × 48 × 40	cm
Overall	56 × 59 × 49	70 × 59 × 59	cm
Shelves			
Size	48 × 30	48 × 40	cm
Number supplied	2	3	
Number of positions	4	6	
Interval between positions	6·5	6·5	cm
Weight, net	24	26	kg
Power rating, max.	150	250	W

IH-150

INCUBATORS, *Gallenkamp*, **Economy, gravity convection,** as specification, for a.c. single phase supplies.

Size No.	1	2	
For 220/240V	**£82·00**	**105·50**	*bx*
For 200/210V	**£82·50**	**107·00**	*bxN*
For 110/120V	**£82·50**	**107·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

IH-154 **Heating elements.**

Incubator Size No.	1	2	
Each	**£3·70**	**3·90**	bx

ACCESSORIES

OV-014	**Extra shelves,** sizes 1 and 2 ...	For prices see entries in List No. sequence.
TJ-050	**Thermometer,** range −10 to 110°C	
TK-115	**Temperature recorder,** range —10 to 110°C	

For suitable **FLOOR STAND** see **OV-482** in List No. sequence.

Gallenkamp COOLED INCUBATORS

Temperature range 0° to 45°C approximately

- **BASIC MODELS**
- **MODELS WITH INTERIOR ILLUMINATION**
- **MODEL FOR INCUBATION IN CO_2/AIR MIXTURES**
- **MODELS WITH CYCLIC TEMPERATURE AND ILLUMINATION CONTROL**

- *Compenstat* (solid state) controlled
- High and low temperature safety thermostats
- Models with integral time switches
- Efficient ducted air circulation by fan
- Integral dial thermometer in control panel
- Magnetic door gasket

Basic model

Model for CO_2/air incubation

DIMENSIONS

Internal	see diagram on page 380
Overall	135H × 50W × 55D cm
Shelves	Four
Capacity, gross	200 litres
Weight, net	60 kg
Power rating, max.	375W

CONSTRUCTION

The outer case is of steel, rust-inhibited and stove enamelled white. The liner is a smooth plastics moulding fitted with shelf supports allowing wide ranges of shelf positions and spacings. Four plated steel grid shelves are supplied. A door-operated interior illuminating lamp is fitted.

For full details and ordering specifications of models available see following pages.

Gallenkamp COOLED INCUBATORS

BASIC MODELS

Suitable for:

- **Biochemical Oxygen Demand (B.O.D.) testing**
- **Accommodates approx. 150 B.O.D. bottles**
- **Incubation serum studies; Enzyme testing**
- **Fruit fly cultivation; Tissue culture work**
- **Immunology; Long term sample storage**

IH-277

PERFORMANCE

Minimum temperature	0°C in 30°C ambient temperatures
	5°C „ 35°C „ „
	10°C „ 40°C „ „

Note: The incubator is unsuitable for use in ambient temperatures above 40°C.

Maximum temperature	45°C at all ambient temperatures
Approximate times to stability for **unloaded** incubator in 20°C ambient:	
	Heating 40 min from 20°C to 45°C
	Cooling 60 min from 20°C to 0degC.
Fluctuation	less than 0·1degC
Variation	±1degC

DIMENSIONS

See pages 377 and 380.

CONSTRUCTION

See page 377.

OPERATION

Temperature is controlled by a *Compenstat* (solid state) thermostat with direct reading scale. Heating is by a sheathed heating element.

Cooling is provided by a hermetically sealed refrigerating system with quiet running compressor. The evaporator coil is mounted with the fan, heater and thermostat elements, in the air duct at the top of the working space.

The refrigerating system is run continuously when operating at temperatures below or near ambient, but may be switched off when working at higher temperatures. The thermostat control head, refrigerator switch and the mains and heater indicator lamps are mounted in the control compartment on top of the incubator. High and low temperature adjustable safety thermostats are fitted. Working temperature is measured and indicated by a dial thermometer, range −10°C to +50°C, mounted in the control panel.

Time cycling

Model IH-277 is available fitted with temperature/time cycling facility for examination of water supplies by the membrane filter technique.†

This model incorporates a time switch and a *Compenstat* (solid state) with two temperature setting controls to give automatic switching between any two temperatures within the range of the incubator in addition to the usual constant temperature operation. The shortest time between switchings is 75 min. Cycles of 12 hrs or 24 hrs duration are readily obtainable and, by using the day omission dial, non-repetitive cycles of up to 7 days duration can be obtained.

†References:

Bacteriological Examination of Water Supplies, HMSO Report 71, 1969.

Water Treatment and Examination, W. S. Holden, 1970.

IH-275

INCUBATOR, COOLED, *Gallenkamp*, as specification, with *Compenstat* (solid state) thermostat, high and low temperature safety thermostats, dial thermometer, four shelves, ducted air circulation by fan, sheathed heating element and hermetically sealed refrigeration unit. Suitable for operation in ambient temperature up to 40°C.

For 220/240V 50 Hz single phase supplies. Each **£231·00** *gx*

For 110/120V 60 Hz single phase supplies. Each **£241·00** *gxN*

IH-277

INCUBATOR, COOLED, *Gallenkamp*, as IH-275 but incorporating time switch and dual control *Compenstat* (solid state) thermostat to give either constant temperature or cyclic temperature control.
For 220/240V 50 Hz single phase supplies. Each **£252·00** *gx*

When ordering please state voltage and frequency of supply.

ACCESSORIES

IH-279	**Shelf** ... ... Each	**£2·40** *bx*
LX-110	**Lubricant** for fan motor bearings. For price see entry in List No. sequence.	

Gallenkamp COOLED INCUBATORS

REGD TRADE MARK

MODELS WITH INTERIOR ILLUMINATION

APPLICATIONS

The Cooled Incubator with fluorescent interior illumination provides a wide range of conditions for studies of synthesising organisms. Temperatures are attainable within the cabinet, enabling the user to study the growth of organisms under tropical or temperate and summer or winter conditions independent of ambient temperature.

Plant growth and oceanographic studies as well as work with algae, moulds and blue-green algae are within the scope of the cabinet. With the illumination switched off, all the functions of a conventional cooled incubator are offered. For example, the incubator may be used to grow organisms for a set period and then the refrigerator can be switched on to suspend further growth for as long as required.

This type of incubator is finding increasing use in many biology, botany, virology, oceanography, water pollution, sewage, agriculture and food research laboratories.

OPERATION

As IH-275 but fitted with six 30 cm long 8W fluorescent lamps mounted three on either side of the workspace. The lamps are controlled by switches on the control box and the lamp ballasts are mounted clear of the working space to prevent their uncontrolled heat from entering the incubator.

Time cycling

As model IH-277 but with switches for the internal lamps to allow these to be operated continuously or for one, two or three pairs of lamps to be switched on and off at the same times that the temperature changes are initiated.

IH-285

INCUBATOR, COOLED, *Gallenkamp*, as specification with **interior fluorescent illumination.** With *Compenstat* (solid state) thermostat, high and low temperature safety thermostats, dial thermometer, shelves, ducted air circulation by fan, sheathed heating element and hermetically sealed refrigeration unit. Suitable for operation in ambients up to 40°C.

For 220/240V 50 Hz single phase supplies. Each **£298·00** *gx*
For 110/120V 60 Hz single phase supplies. Each **£308·00** *gxN*

IH-287

INCUBATOR, COOLED, *Gallenkamp*, as IH-285 but incorporating time switch, dual control *Compenstat* (solid state) thermostat and switches to give constant temperature, constant illuminations conditions and a wide range of cyclic temperature, cyclic illumination conditions.
For 220/240V 50 Hz single phase supplies. Each **£323·00** *gx*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

VS-629	**Lamp, fluorescent,** 8W.	For price see entry in List No. sequence.

When ordering replacement parts please state serial number of incubator and supply voltage.

ACCESSORIES

IH-279	**Shelf**	For prices see entries in List No. sequence.
LX-110	**Lubricant,** for fan motor bearings	

- **Fitted with six 8W fluorescent lamps**
- **Even illumination on equally spaced shelves**
- **Model available fitted with time switch to provide conditions of cyclic temperature and cyclic illumination**

IH-285

PERFORMANCE DIMENSIONS

As IH-275 except the following:

Minimum temperature with lamps on	10°C in 30°C ambient temperature
	15 C ,, 35 C ,, ,,
	20 C ,, 40 C ,, ,,
Power rating, max.	425W

Gallenkamp COOLED INCUBATORS

FOR INCUBATION IN CO_2/AIR MIXTURES

- **Gas inlet and sampling nozzles**
- **Unsealed inner Perspex door**

IH-295

APPLICATIONS

This incubator meets the needs of laboratories in which cultures are grown for physiological, immunological, radiobiological, virological and other studies, especially where the work requires reliable maintenance of sub-ambient and near-ambient temperatures. Favourable conditions for the cultivation of animal cells are provided when the culture medium is buffered with phosphate-bicarbonate mixtures and the medium is in equilibrium with carbon dioxide in the gas phase. The incubator **is not suitable for use where conditions of high humidity must be achieved and maintained in the working space such as is necessary for open dish culture of mammalian cells.**

The incubator also has other applications in biological sciences. It can, for example, be used for the cultivation of bacteria that grow best in the presence of CO_2 (usually about 5%) enriched atmospheres.

CONSTRUCTION

As IH-275 but with an inlet nozzle at the rear of the control box providing a means of admitting CO_2 or air/CO_2 mixtures and a similar nozzle is provided for monitoring CO_2 concentration. A 6 mm thick inner Perspex door minimises atmosphere loss when the outer door is opened to inspect samples. A dial thermometer is fitted in the control panel.

PERFORMANCE AND DIMENSIONS

As for IH-275 on page 378.

IH-295

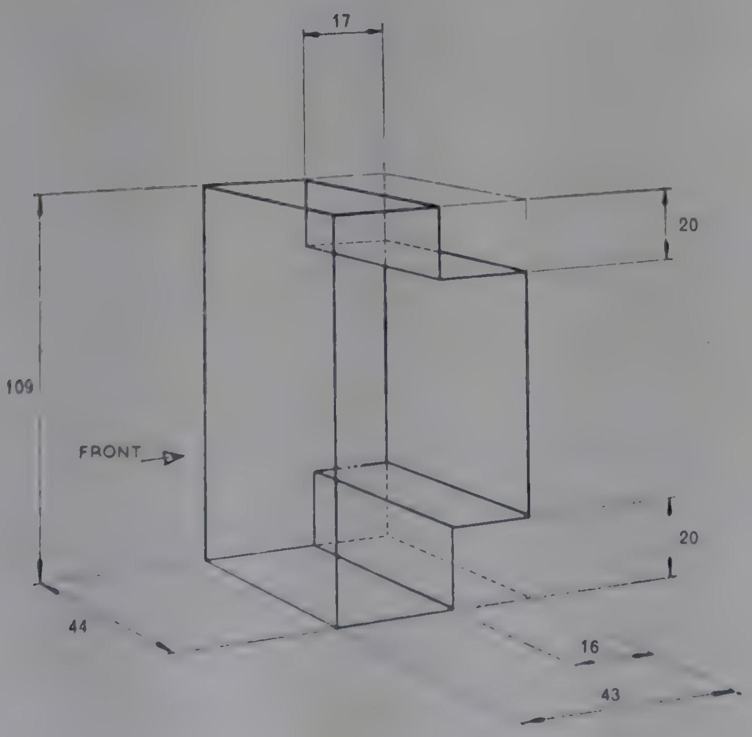
INCUBATOR, COOLED, *Gallenkamp*, for incubations in CO_2 enriched atmospheres, as specification, fitted with gas inlet and sampling nozzles, dial thermometer and unsealed inner Perspex door.

For 220/240V 50 Hz single phase supplies.	Each	**£271·00**	*gx*
For 110/120V 60 Hz single phase supplies.	Each	**£281·00**	*gxN*

ACCESSORIES

IH-279	**Shelf**	For prices see entries in List No. sequence.
LX-110	**Lubricant,** for fan motor bearing	

APPROXIMATE INTERNAL SHAPE AND DIMENSIONS (cms) OF INCUBATORS IH-275 to IH-295



Gallenkamp GAS ANALYSERS

FOR CO_2 ESTIMATION

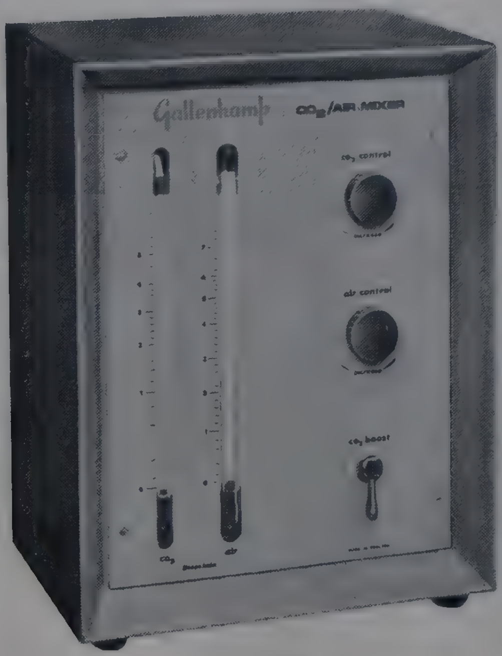
GC-020 to GC-120	**Orsat Gas Analysers,** approximate accuracy 1%.
GC-300 to GC-350	**Haldane Gas Analysers,** approximate accuracy 0·05%.
GC-400 to GC-414	**Lloyd Gas Analysers,** approximate accuracy 0·02%.

For details see entries in List No. sequence.

Gallenkamp CO$_2$/AIR BLENDER

FOR USE WITH CO$_2$ INCUBATORS

- **Simple control of CO$_2$/air ratios**
- **Installed in minutes—easy to adjust**
- **Individual flowmeters for CO$_2$ and air**
- **Fitted with CO$_2$ boost switch**



IH-345

IH-345

BLENDER, CO$_2$/AIR, *Gallenkamp*, for measuring and controlling carbon dioxide/air mixtures into incubators and environmental chambers. Incorporates needle valves, inlet nozzles and flowmeters for carbon dioxide and air and a single outlet nozzle for the gas mixture.
The flowmeters are scaled 0·05 to 0·6 l/min CO$_2$ and 0·5 to 7·0 l/min air respectively and a by-pass valve allows CO$_2$ to be injected rapidly into the chamber. In metal case for bench mounting. All nozzles accept 6·5 mm bore flexible tubing.

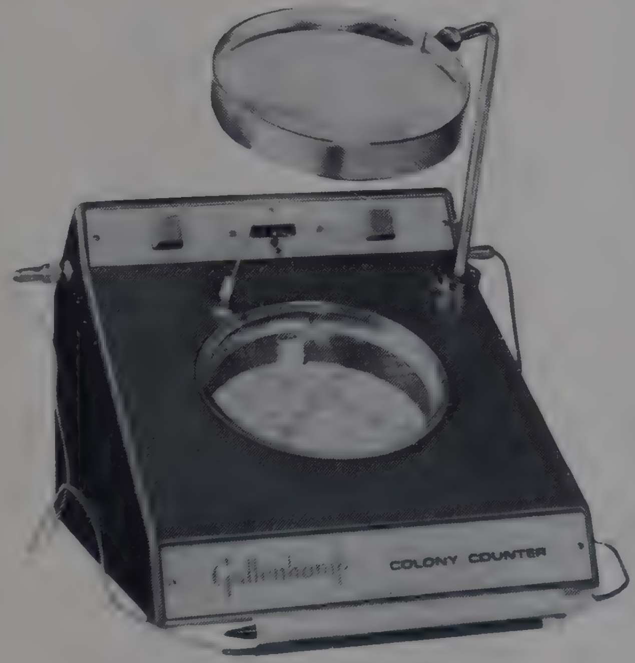
Overall dimensions	20×25×32 cm high.
Weight, net	4 kg.

Each **£83·00** *bx*

ACCESSORIES

TX-772	**Tubing,** PVC, size N6·5	For details and prices see entries in List No. sequence.
CP-285	**Clip,** maximum diameter 14 mm ...	
GD-510	**Pressure regulator** for CO$_2$ ...	
GD-530	**Pressure regulator** for air ...	

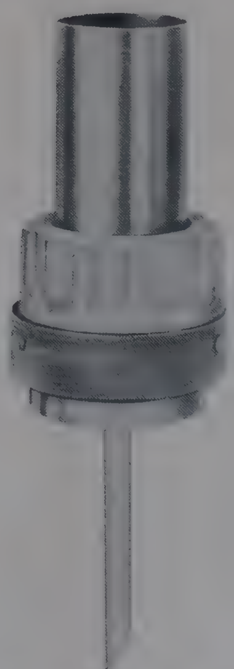
Gallenkamp COLONY COUNTER



For accurate counting of bacterial and mould colonies.

For details and prices see CX-300 et seq. in List No. sequence.

Gallenkamp MEMBRANE FILTERS

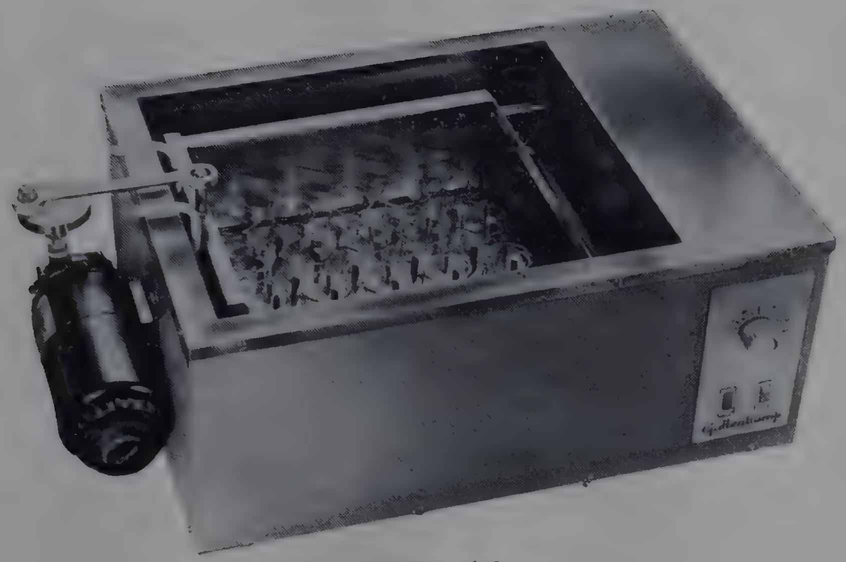


Widely used to filter liquids for the separation, examination and analysis of particulate and biological matter.

For details and prices see FD-300 et seq. in List No. sequence.

Gallenkamp SHAKING

- Thermostatic control up to 80°C
- Variable shaking speeds to 200/min
- Variable stroke length
- Stainless steel construction



IH-350 with
IH-352 and WF-404

PERFORMANCE

Temperature range

Without cover	Ambient† to 50°C
With cover	Ambient† to 80°C

(†For operation near or below ambient temperature the cooling coil must be fitted and supplied with cold water.)

Temperature fluctuation	0·1degC
Stroke lengths	12·5, 25 or 38 mm
Shaker speed	Continuously variable from 50/min to maxima as follows:

Stroke	Max. speed
12·5 mm	200/min
25 mm	140/min
38 mm	100/min

DIMENSIONS

	H	W	D
Overall	22 ×	50 ×	35 cm
Bath interior	16 ×	35 ×	30 cm
Rack size		28 ×	23 cm
Power rating, max.	500W		
Weight, net	13 kg		

SHAKING REACTION INCUBATOR 15 LITRE CAPACITY

- Direct reading *Compenstat* (solid state) control to within 0·1degC
- Airtight covers for anaerobic working

IH-350

INCUBATOR, SHAKING REACTION, *Gallenkamp*, comprising stainless steel water bath, thermostatically controlled by direct reading *Compenstat* (solid state) thermostat, heated by a 500W metal-sheathed element and with rack carriage and drive motor with speed control having an OFF position. Includes mains switch and load indicator lamp. **Without racks, covers or other accessories.** For single phase supplies.

For 220/240V 50 Hz	Each	**£161·00**	*bx*
For 200/210V 50 Hz	Each	**£163·00**	*bxN*
For 110/120V 60 Hz	Each	**£163·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

WF-402 **Heater, 500W.** For details and price see entry in List No. sequence.

ACCESSORIES

SAMPLE CONTAINER RACKS, stainless steel.

List No.	Type of container	Capacity of container	No. of containers	Each	
				£	
IH-352	Conical flasks or beakers	25 ml	20	**5·50**	*bx*
IH-354	Conical flasks	50 ml	10	**4·70**	*bx*
IH-355	,, ,,	100 ml	8	**7·70**	*bx*
IH-357	,, ,,	150 ml	6	**6·20**	*bx*
IH-358	,, ,,	250 ml	4	**5·40**	*bx*
IH-359	Test tubes	125 × 16 mm	48	**8·50**	*bx*

IH-360	**Cover, gabled, stainless steel,** covering entire bath. **Not airtight** ... ... Each **£14·00** *bx*	
IH-362	**Cover, gabled, stainless steel,** covering half rack (two may be fitted) and forming airtight water seal. With gas tubulure, for **anaerobic** working ... Each **£8·25** *bx*	
WF-404	**Cooling coil**	For prices see entries in List No. sequence.
WF-406	**Thermometer holder**	
IH-110	**Thermometer,** scale span 10°C to 60°C.	
TJ-440	**Thermometer,** scale span 0°C to 110°C.	
BJ-655	**Beaker,** 25 ml	
FJ-050	**Flasks,** conical, 25, 50, 100, 150 and 250 ml	
TF-180	**Test tube,** 125 × 16 mm	

REACTION INCUBATORS

Applications include:

Shaken culture techniques

Chemical and biological reactions

Reaction kinetics studies

SHAKING REACTION INCUBATOR
70 LITRE CAPACITY

- **Accurate solid state speed controller with direct reading scale. Tacho generator ensures stability of shaking speed at all settings**
- **Up to 65 samples simultaneously shaken**
- **Contact thermometer control to within 0·2degC**

IH-370

IH-370

INCUBATOR, SHAKING REACTION, *Gallenkamp*, comprising stainless steel water bath, thermostatically controlled by adjustable contact thermometer in conjunction with a 3-heat power switch, heated by two 1 kW metal-sheathed elements, with rack carriage, drive motor and solid state speed controller with direct reading scale having a zero speed position. With mains and load indicator lamps. **Without racks, cover or other accessories.** For single phase supplies.

For 220/240V 50 Hz	Each **£309·00**	*bx*
For 200/210V 50 Hz	Each **£319·00**	*bxN*
For 110/120V 60 Hz	Each **£319·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

WF-472	**Heater, 1000W, inner** ...	For details and prices see entries in List No. sequence.
WF-474	**Heater, 1000W, outer** ...	
TM-866	**Contact thermometer,** 0–100°C	

ACCESSORIES

SAMPLE CONTAINER RACKS, stainless steel.

List No.	Type of container	Capacity of container	No. of containers	Each	
				£	
IH-378	Conical flasks	50 ml	65	37·00	*bx*
IH-380	,, ,,	100 ml	45	30·00	*bx*
IH-382	,, ,,	250 ml	25	24·00	*bx*
IH-384	,, ,,	500 ml	20	21·00	*bx*

IH-390	**Cover, gabled, stainless steel,** covering entire bath. **Not airtight**	Each **£23·50**	*bx*
IH-392	**Cooling coil**	Each **£14·00**	*bx*
IH-110	**Thermometer, 10–60°C** ...	For details and prices see entries in List No. sequence.	
TJ-440	**Thermometer, 0–110°C** ...		
FJ-050	**Flasks, 50, 100, 250 and 500 ml.**		

PERFORMANCE

Temperature range	
Without cover	Ambient† to 50°C
With cover	Ambient† to 80°C

(†For operation near or below ambient temperature the cooling coil IH-392 must be fitted and supplied with cold water.)

Temperature fluctuation	0·2degC
Stroke lengths	6, 12, 19, 25, 31 or 38 mm
Shaker speed	Continuously variable from 20 to 200/min. Load diagram on control panel shows maximum speed for combinations of load and stroke length.

DIMENSIONS

	H	W	D
Overall	37 ×	84 ×	56 cm
Bath interior	28 ×	60 ×	46 cm
Rack size		53 ×	43 cm

Depth of water above rack	max. 20 cm min. 2·5 cm
Power rating, max.	2000W
Weight, net	51 kg

Gallenkamp ORBITAL INCUBATORS

For growing cultures of micro-organisms and tissue cells under controlled conditions of temperature and agitation. The orbiting motion of the sample platform minimises accretion of material on the sides of flasks, provides good transfer of gas to the culture and avoids undue buffeting of the organisms and cells.

Three models available:

IH-460	basic heated incubator.
IH-465	heated and refrigerated incubator.
IH-490	incubator with heating, refrigeration and interior illumination, with timer for programmed cycling.

Applications in:

Bacteriology, Biochemistry,
Botany, Immunology,
Metallurgy, Microbiology,
Virology and Zoology.

Basic model

Illuminated refrigerated model

- **Compenstat (solid state) temperature control**
- **Built-in safety thermostats**
- **Solid state speed controller with calibrated scale**
- **Adjustable ventilation control**
- **Facility for introduction of gas mixtures**
- **Lids fitted with magnetic gaskets**
- **Range of interchangeable sample platforms**
- **Up to 36 samples simultaneously incubated**
- **Adjustable counterbalancing of loads**
- **Conveniently placed high level controls**
- **Built for reliable operation over long periods**
- **Easily cleaned stainless steel interior**

Gallenkamp ORBITAL INCUBATORS

OPERATION

Orbiting action. Culture vessels are mounted on a platform which is driven in a circular orbital motion at a speed closely regulated by a solid state controller. The controlled motion of the platform provides the conditions required for the efficient transfer of oxygen (or other gases) between the gaseous and liquid phases in the culture vessels.
Long term reliability and quiet running result from the platform being mounted on accurately aligned double row rigid ball journals. Culture flasks up to 2 litre capacity may be used, there being 35 cm clearance between the platform and the lid.
A manually adjustable counterbalancing system is provided so that vibration can be reduced for any given load.

Temperature. Uniform temperature is maintained throughout the incubator by solid state *Compenstat* thermostatic control of air circulated by means of a motor driven fan and associated ducting. Upper and lower temperature safety thermostats are fitted as necessary for the temperature range of the incubator.

Cooling. For operation near or just below ambient temperature a cooling coil is available. For operation at temperatures well below ambient the model with integral refrigeration must be used.

Atmosphere. Adjustment of the ventilator permits a wide variation in the volume of fresh air passing through the incubator. With the ventilator and drain tubes closed other atmospheres can be introduced. The magnetic gasket on the lid ensures that gas leakage is reduced to a minimum.

TECHNICAL DATA

Temperature range:	
Basic Model	5degC above ambient to 70°C (with water cooling coil IH-467 the incubator will operate down to temperatures generally near or just below ambient).
Refrigerated Model	20°C below ambient to 70°C
Temperature fluctuation of samples:	Less than 0·1degC
Temperature variation between samples:	Less than ± 0·5degC
Diameter of orbit:	32 mm
Orbiting speed range:	40 to 400/min stepless
Capacity:	36 × 250 ml conical flasks 28 × 500 ml conical flasks 18 × 1 litre conical flasks 11 × 2 litre conical flasks For efficient agitation and aeration each flask should contain not more than 25% of its nominal capacity.

Dimensions etc.

	H		W		D	
Overall	73	×	99	×	66 cm	
Internal	35	×	76	×	55 cm	
Platform			68	×	48 cm	
Window			48	×	38 cm	

Weight, net	
Basic Model	106 kg
Refrigerated Model	125 kg
Power rating, max:	
Basic Model	1·2 kW
Refrigerated Model	1·5 kW

DESIGN DETAILS

The inner surfaces of the incubator are stainless steel and a drain tube is provided. A double glazed toughened glass window is sealed into the lid. The hinged, counterbalanced lid is fitted with a magnetic gasket and clips are provided on the underside so that a thermometer, when fitted, can be read through the window. The interchangeable accessory platforms are covered with a white plastics laminate for ease of cleaning and are fitted with spring clips to hold conical flasks.

IH-460

INCUBATOR, ORBITAL, *Gallenkamp*, temperature range 5degC above ambient to 70°C, as specification with orbital drive mechanism, solid state speed control and load counterbalancing system. Temperature control by *Compenstat* (solid state) thermostat. With upper temperature limit safety thermostat, counterbalanced lid with window and thermometer clips but without thermometer. Orbiting speed range 40 to 400/min. **Requires but does not include flask platform** (see Accessories).

For 220/240V 50 Hz single phase supplies. Each **£503·00** *bx*

For 110/120V 60 Hz single phase supplies. Each **£525·00** *bxN*

IH-465

INCUBATOR, ORBITAL, refrigerated model, *Gallenkamp*, temperature range 20degC below ambient to 70°C, as specification with orbital drive mechanism, solid state speed control and load counterbalancing system. With integral refrigerator mounted in the base of the cabinet. Temperature control by *Compenstat* (solid state) thermostat. With upper and lower temperature safety thermostats, counterbalanced lid with window and thermometer clips but without thermometer. Orbiting speed range 40 to 400/min. **Requires but does not include flask platform** (see Accessories).

For 220/240V 50 Hz single phase supplies. Each **£711·00** *bx*

For 110/120V 60 Hz single phase supplies. Each **£746·00** *bxN*

When ordering please state voltage and frequency of supply.

ACCESSORIES

IH-467 **Cooling coil** with nozzles for nominal 6 mm bore flexible tubing and instructions for fitting. **For use with IH-460 only.** Requires a supply of cooling water. Each **£20·00** *bx*

Platforms, interchangeable, with clips to accept conical flasks.

List No.	For conical flasks capacity (ml)	No. of positions	Each	
			£	
IH-472	250	36	**40·00**	*bx*
IH-474	500	28	**40·00**	*bx*
IH-476	1000	18	**40·00**	*bx*
IH-479	2000	11	**57·00**	*bx*

CX-380	**Culture flasks,** conical, with side indents, capacities 500 ml to 2000 ml	For details and prices see entries in List No. sequence.
FJ-050	**Flasks,** conical	
TJ-070	**Thermometer,** −5 to 105°C	
TX-772	**Tubing,** PVC, designation N6·5	
TM-975	**Thermo-circulator,** refrigerated, for pumping liquids through cooling coil ...	

Incubator with illumination, refrigeration and time switch—see overleaf.

Gallenkamp ORBITAL INCUBATORS

REGD. TRADE MARK

Model with Refrigeration, Illumination and Automatic Temperature/Illumination cycling

Applications in biological and botanical studies where photosynthesis plays a part in the growth cycle

- **Illumination from 1 to 7 fluorescent tubes**
- **Automatic timer for temperature/illumination cycling**
- **Solid state controllers for temperature and sample platform speed**
- **Upper and lower limit temperature safety thermostats**

IH-490

TECHNICAL DATA

Temperature range:	15degC below ambient to 70°C
Temperature fluctuation of samples:	less than 0·1degC
Temperature variation between samples:	less than ± 0·5degC
Diameter of orbit:	32 mm
Orbiting speed range:	40 to 400/min stepless
Capacity:	36 × 250 ml conical flasks 28 × 500 ml conical flasks 18 × 1 litre conical flasks 11 × 2 litre conical flasks For efficient agitation and aeration each flask should contain not more than 25% of its nominal capacity.
Illumination:	1 to 7 30W fluorescent tubes

Dimensions etc.

	H	W	D
Overall	85	104	66 cm
Internal	35	76	55 cm
Platform		68	48 cm
Weight, net	130 kg		
Power rating, max:	1·85 kW		

OPERATION

Orbiting action. Culture vessels are mounted on a platform which is driven in a circular orbital motion at a speed closely regulated by a solid state controller. The controlled motion of the platform provides conditions required for the efficient transfer of oxygen (or other gases) between the gaseous and liquid phases in the culture vessels.

Long term reliability and quiet running result from the platform being mounted on accurately aligned double row rigid ball journals. Culture flasks up to 2 litre capacity may be used, there being 35 cm clearance between platform and the lid.

A manually adjustable counterbalancing system is provided so that vibration can be reduced to a minimum for any given load.

Temperature. Uniform temperature is maintained throughout the incubator by solid state *Compenstat* thermostatic control of air circulated by means of a motor driven fan and associated ducting. Upper and lower temperature safety thermostats are provided.

Cooling. A built-in refrigerator is provided for operation near or below ambient temperature.

Atmosphere. Adjustment of the ventilator permits a wide variation in the volume of fresh air passing through the incubator. With the ventilator and drain tubes closed other atmospheres can be introduced. The magnetic gasket on the lid ensures that gas consumption is reduced to a minimum.

Illumination. Seven fluorescent tubes are mounted on the underside of the lid. The ON/OFF switching is arranged so that uniform illumination from 1 up to 7 tubes can be achieved.

Automatic cycling. A 24-hour time switch provides cycling of temperature and illumination. Conditions of constant temperature, cycled illumination with cycled temperature, and cycled illumination can be achieved. When temperature and illumination are both cycled the changes are initiated simultaneously.

DESIGN DETAILS

The inner surfaces of the incubator are stainless steel. Seven fluorescent tubes are mounted on the underside of the hinged counterbalanced lid with are flector behind and a Perspex sheet separating them from the working space. The lid has no window but an air blower, used to reduce heat transfer from the tubes to the working space and a dial indicating thermometer are fitted. The interchangeable accessory platforms are covered with a white plastics laminate for ease of cleaning and fitted with spring clips to hold conical flasks.

IH-490

INCUBATOR, ORBITAL, illuminated refrigerated model, *Gallenkamp*, temperature range 15degC below ambient to 70°C, as specification, with orbital drive mechanism, solid state speed control, load counterbalancing system and integral refrigerator. Temperature control by *Compenstat* (solid state) thermostat. With upper and lower temperature safety thermostats, 24 hour timer and counterbalanced lid fitted with fluorescent tubes and dial thermometer. Orbiting speed range 40 to 400/min. **Requires but does not include flask platform** (see Accessories).

For 220/240V 50 Hz single phase supplies. Each **£937·00** *bx*

For 110/120V 60 Hz single phase supplies. Each **£1011·00** *bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

IH-497 **Fluorescent tube, 30W** ... ... Each **£1·05** *bx*

ACCESSORIES

Platforms, interchangeable, with clips to accept conical flasks—see IH-472 to IH-479 on page 385.

JARS

JE-100

JARS, battery, glass, with ground rim.

Capacity approx.	300	900	1200	2000 ml	
Height	125	150	200	225 mm	
Diameter	75	100	100	125 mm	
Ten	**£5·80**	**7·00**	**10·50**	**12·70**	*mx*
Each	**£0·64**	**0·78**	**1·18**	**1·45**	

JE-235

JARS, specimen, polystyrene, taper sided with extra wide mouth and airtight, close fitting white polythene lids. In packs of 25.

Capacity	20	35	85	180	280	360 ml	
Height	25	35	35	75	85	110 mm	
Top dia.	40	45	68	68	82	82 mm	
10 packs	**£6·00**	**6·20**	**8·40**	**10·00**	**12·80**	**14·60**	*cx*
Pack	**£0·66**	**0·70**	**0·94**	**1·12**	**1·45**	**1·65**	

***JE-410**

JARS, specimen, soda-lime glass, with foot and ground-in cover with knob.

Capacity approx.	400	550	750	2800 ml	
Diameter	80	80	80	120 mm	
Height	120	150	200	300 mm	
Ten	**£16·50**	**19·00**	**21·00**	**45·00**	*cx*
Each	**£ 1·85**	**2·15**	**2·35**	**5·00**	

JE-440

JAR, specimen, soda-lime glass, 25 cm high, 20 cm dia. with drop-on lid and knob. Capacity approx. 7 litres.

Ten **£24·00** Each **£2·65** *cx*

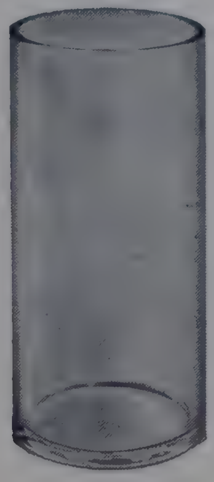
JE-520

JARS, specimen, *Perspex*, rectangular, polished flat surfaces on all sides. With cover.

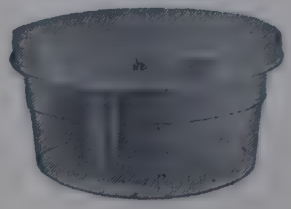
Height	5	10	15	17·5 cm	
Width	5	7·5	10	12·5 cm	
Depth	2·5	5	5	10 cm	
Ten	**£4·30**	**6·60**	**9·00**	**17·00**	*mx*
Each	**£0·48**	**0·74**	**1·00**	**1·90**	
Height	20	22·5	25	30 cm	
Width	15	15	15	20 cm	
Depth	10	7·5	10	10 cm	
Ten	**£20·00**	**22·00**	**23·00**	**31·00**	*mx*
Each	**£ 2·25**	**2·45**	**2·55**	**3·40**	

PP-624

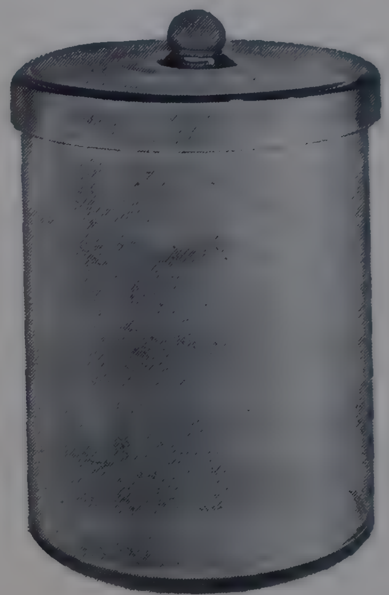
SHEET, *Perspex*, suitable for cutting into mounting plates for jars JE-520 see details in List No. sequence.



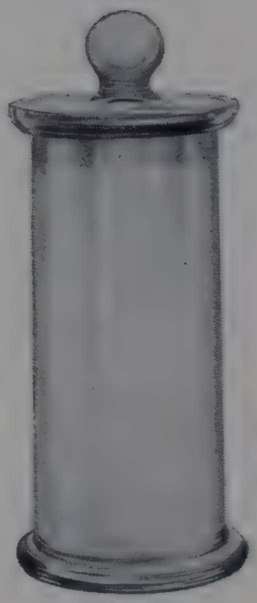
JE-100



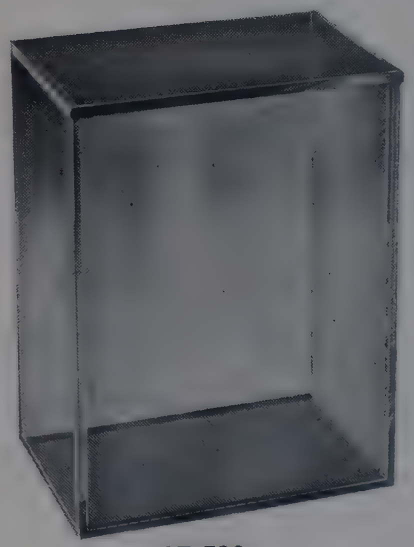
JE-235



JE-440



JE-410



JE-520

BT-220
JARS, (Bottles) polythene, extra wide neck.

BT-225
JARS, (Bottles) rigid polythene, extra wide neck, square shape.

BT-265
JARS, (Bottles) glass, extra wide neck.

BT-290
JARS, (Bottles), Kilner.

GD-250
GAS COLLECTING JARS, with ground flange.

HT-500
HYDROMETER TRIAL JARS, glass.

HT-520
HYDROMETER TRIAL JARS, polythene.
For details of above items see entries in List No. sequence.

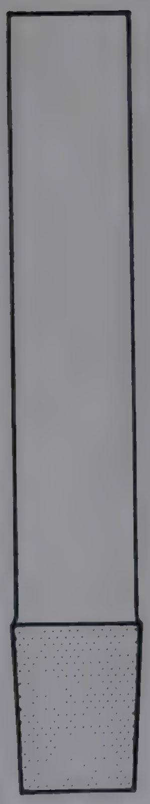
QUICKFIT AND CLEARFIT JOINTS

TO BS 572

CONE JOINTS

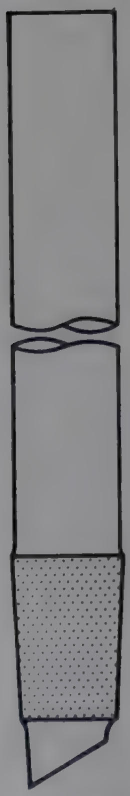
JR-010
CONE JOINTS, *Quickfit*, plain end, borosilicate glass.

BS 572 Size No.	Approx. tube ext. dia., mm	Ref. No.	Std. pack of 20	Each	
			£	£	
5/13	4	CNB5	6·80	0·41	jx
7/16	7	CNB7	6·00	0·37	jx
10/19	9	CNB10	5·80	0·36	jx
12/21	12	CNB12	5·80	0·36	jx
14/23	14	CNB14	5·40	0·35	jx
19/26	18	CNB19	5·80	0·36	jx
24/29	23	CNB24	6·40	0·39	jx
29/32	28	CNB29	7·40	0·44	jx
34/35	33	CNB34	8·00	0·47	jx
40/38	39	CNB40	10·00	0·57	jx
45/40	43	CNB45	12·00	0·70	jx
50/42	49	CNB50	13·40	0·78	jx



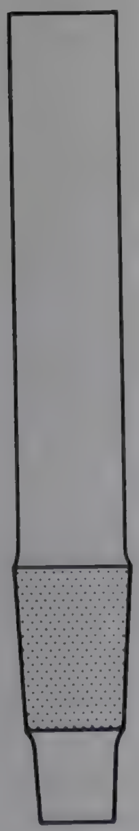
JR-010

JR-012



JR-030

JR-032



JR-035

JR-012
CONE JOINTS, *Clearfit*, plain end, borosilicate glass.

BS 572 Size No.	Approx. tube ext. dia., mm	Ref. No.	Std. pack of 5	Each	
			£	£	
14/23	14	KCNB14	2·10	0·46	jx
19/26	18	KCNB19	2·35	0·51	jx
24/29	23	KCNB24	2·50	0·54	jx
29/32	28	KCNB29	2·65	0·57	jx

JR-030
CONE JOINTS, *Quickfit*, angle drip end, borosilicate glass.

BS 572 Size No.	Approx. tube ext. dia., mm	Ref. No.	Std. pack of 10	Each	
			£	£	
10/19	9	CAB10	3·70	0·43	jx
14/23	14	CAB14	3·40	0·40	jx
19/26	18	CAB19	3·40	0·40	jx
24/29	23	CAB24	4·00	0·46	jx
29/32	28	CAB29	4·50	0·50	jx
34/35	33	CAB34	5·20	0·58	jx

JR-032
CONE JOINTS, *Clearfit*, angle drip end, borosilicate glass.

BS 572 Size No.	Approx. tube ext. dia., mm	Ref. No.	Std. pack of 10	Each	
			£	£	
14/23	14	KCAB14	4·80	0·53	jx
19/26	18	KCAB19	5·70	0·64	jx
24/29	23	KCAB24	6·00	0·66	jx
29/32	28	KCAB29	6·30	0·70	jx

JR-035
CONE JOINTS, *Quickfit*, long tip, borosilicate glass.

BS 572 Size No.	Approx. tube ext. dia., mm	Ref. No.	Std. pack of 10	Each	
			£	£	
7/16	7	CBB7	3·80	0·44	jx
10/19	9	CBB10	3·30	0·39	jx
14/23	14	CBB14	2·90	0·35	jx
19/26	18	CBB19	3·20	0·38	jx
24/29	23	CBB24	3·60	0·42	jx
29/32	28	CBB29	4·00	0·46	jx
34/35	33	CBB34	4·30	0·48	jx
40/38	39	CBB40	5·20	0·58	jx
45/40	43	CBB45	6·20	0·70	jx

QUICKFIT AND CLEARFIT JOINTS

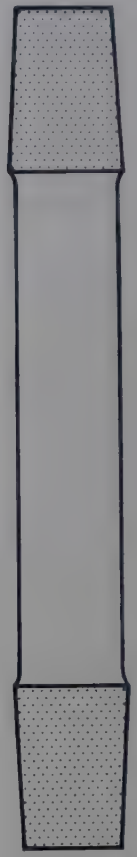
JR-037
CONE JOINTS, *Clearfit*, long tip, borosilicate glass.

BS 572 Size No.	Approx. tube ext. dia., mm	Ref. No.	Std. pack of 5	Each	
			£	£	
14/23	14	KCBB14	2·20	0·48	jx
19/26	18	KCBB19	2·65	0·57	jx
24/29	23	KCBB24	2·80	0·60	jx
29/32	28	KCBB29	3·00	0·66	jx

JR-040
CONE JOINTS, *Quickfit*, double cone, plain ends, borosilicate glass.

BS 572 Size No.	Approx. tube ext. dia., mm	Ref. No.	Std. pack of 10	Each	
			£	£	
10/19	9	CND0/50	5·20	0·58	jx
14/23	14	CND1/80	4·80	0·54	jx
19/26	18	CND2/80	5·20	0·58	jx
24/29	23	CND3/95	5·50	0·62	jx
34/35	33	CND5/150	7·40	0·82	jx

JR-037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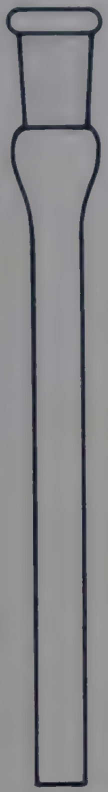
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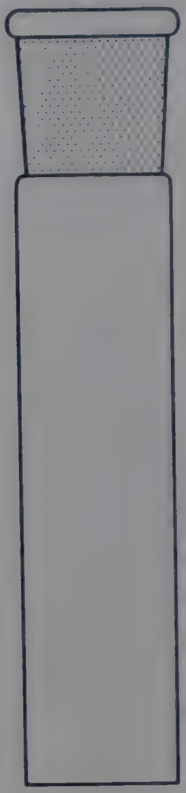
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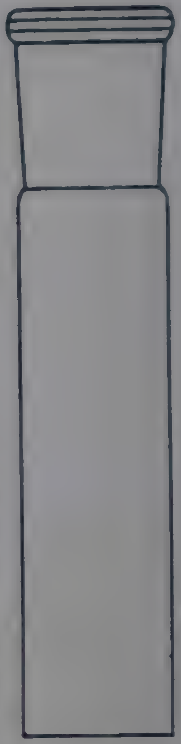

JR-082

SOCKET JOINTS

JR-075
SOCKET JOINTS, *Quickfit*, bulged shoulder, borosilicate glass.

BS 572 Size No.	Approx. tube ext. dia., mm	Ref. No.	Std. pack of 2	Each	
			£	£	
5/13	6	SBB5	1·06	0·55	jx
7/16	7	SBB7	1·14	0·59	jx

JR-080
SOCKET JOINTS, *Quickfit*, plain shoulder, borosilicate glass.

BS 572 Size No.	Approx. tube ext. dia., mm	Ref. No.	Std. pack of 20	Each	
			£	£	
7/16	11	SRB7	8·00	0·47	jx
10/19	14	SRB10	6·40	0·39	jx
12/21	15	SRB12	6·40	0·39	jx
14/23	18	SRB14	5·80	0·36	jx
19/26	23	SRB19	5·80	0·36	jx
24/29	28	SRB24	6·40	0·39	jx
29/32	33	SRB29	7·80	0·46	jx
34/35	40	SRB34	8·60	0·50	jx
40/38	46	SRB40	10·40	0·60	jx
45/40	53	SRB45	12·40	0·72	jx
50/42	57	SRB50	14·60	0·84	jx

JR-082
SOCKET JOINTS, *Clearfit*, plain shoulder, borosilicate glass.

BS 572 Size No.	Approx. tube ext. dia., mm	Ref. No.	Std. pack of 5	Each	
			£	£	
14/23	18	KSRB14	2·10	0·46	jx
19/26	23	KSRB19	2·20	0·48	jx
24/29	28	KSRB24	2·50	0·54	jx
29/32	33	KSRB29	2·65	0·57	jx

CARE OF GROUND GLASS JOINTS

A thin film of ptfe applied to ground joints by spraying with aerosol provides efficient lubrication.

For best results the film should be evenly deposited, and for this purpose the joint should be slowly rotated at steady speed whilst the aerosol is applied.

For a suitable aerosol lubricant see LX-245 in List No. sequence.

Flat flange and spherical joints and accessories see overleaf.

QUICKFIT JOINTS

JOINT SPRINGS

JR-140

SPRINGS, for use on joints with hooks. In packs of 10.

Length	25	38	50 mm	
For joints from	7/16	14/23	40/38	
to	12/21	34/35	55/44	
10 packs	£3·00	3·50	5·80	cx
Pack	£0·36	0·41	0·64	

FLAT FLANGE JOINTS

JR-180

FLAT FLANGE JOINTS, *Quickfit,* interchangeable borosilicate glass, for vacuum work.

Nominal bore, mm	Approx. flange dia., mm	Ref. No.	Ten	Each	
			£	£	
15	45	FG15	11·50	1·30	jx
25	55	FG25	13·00	1·45	jx
35	75	FG35	17·00	1·90	jx
50	85	FG50	22·00	2·45	jx

SPHERICAL JOINTS

TO BS 2761

A complete joint comprises one JR-250 with one JR-255.

JR-250

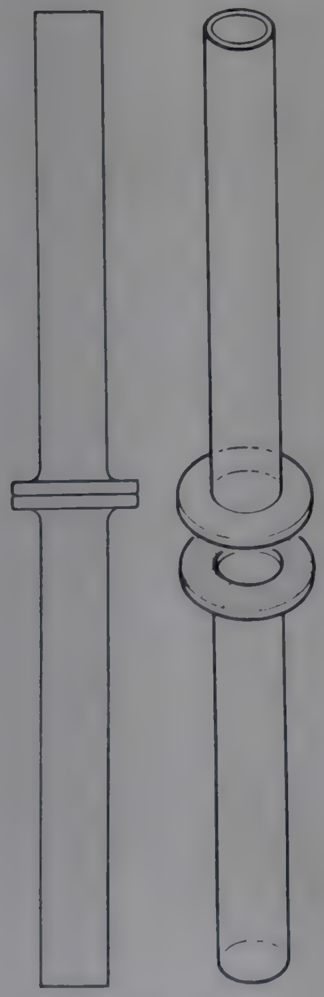
BALL JOINTS, *Quickfit,* borosilicate glass, interchangeable inner portions of spherical joints, designed to avoid rigidity rather than to allow appreciable deflection.

Nominal bore, mm	Ref. No.	Std. pack qty.	Std. pack	Each	
			£	£	
2	MS13C	10	5·10	0·57	jx
5	MS13	20	10·20	0·59	jx
9	MS19	20	11·00	0·64	jx
15	MS29	20	15·00	0·86	jx
21	MS35	10	8·70	0·96	jx
27	MS41	5	4·80	1·04	jx

JR-255

CUP JOINTS, *Quickfit,* borosilicate glass, interchangeable outer portions of spherical joints.

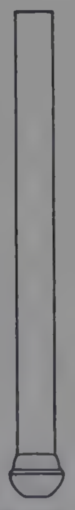
Nominal bore, mm	Ref. No.	Std. pack qty.	Std. pack	Each	
			£	£	
2	FS13C	10	5·90	0·66	jx
5	FS13	20	11·80	0·68	jx
9	FS19	20	13·00	0·74	jx
15	FS29	20	15·00	0·86	jx
21	FS35	5	4·55	0·98	jx
27	FS41	5	5·00	1·08	jx



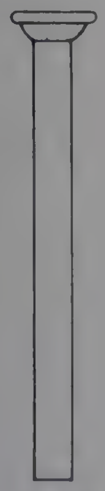
2 Joints FG15

JR-180

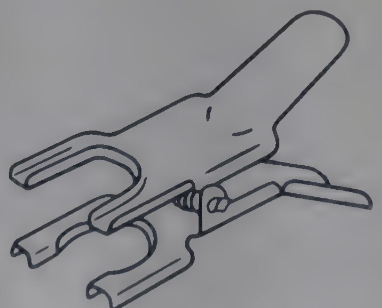
JR-140



JR-250



JR-255



JR-260

Ref. Nos. JC13 to JC51

JC50F, JC75F and JC100F are made of stainless steel wire.

JOINT CLIPS

JR-260

JOINT CLIPS, *Quickfit,* for holding flat flanges and spherical joints.

For ball and cup joint. Size	For flat flange. Bore mm	Ref. No.	Std. pack qty.	Std. pack	Each	
				£	£	
S13	2	JC13	20	6·40	0·39	jx
S19	5	JC19	20	7·60	0·45	jx
S29	10	JC29	10	3·80	0·44	jx
S35	15	JC35	5	2·15	0·47	jx
S41	25	JC41	5	2·40	0·52	jx
S51	—	JC51	5	3·25	0·70	jx
—	50	JC50F	5	4·55	0·98	jx
—	75	JC75F	5	5·00	1·08	jx
—	100	JC100F	5	5·00	1·08	jx

JUGS

JV-110

JUGS, rigid polypropylene, with spout and handle. Graduated in pints, fl. oz., litres and decilitres.

Capacity	½	1 litre	
Ten	£1·70	2·70	*cx*
Each	£0·24	0·33	

***JV-130**

JUGS, stainless steel, tapered, with handle, spout and concave base. Graduated inside in litres and decilitres.

Capacity	½	1	2 litres	
Each	£1·10	1·80	2·70	*mx*

JV-140

JUGS, stainless steel, with handle, spout and **flat base.** Graduated in cc, pints and fl. oz. Capacities ½ and 1 litre have tapered sides and capacities 2 and 4 litre have straight sides.

Capacity	½	1	2	4 litre	
Each	£2·20	2·50	4·70	6·70	*mx*

JV-110

JV-130

JV-140
Capacities ½ and 1 litre

JV-140
Capacities 2 and 4 litre

KARL FISCHER APPARATUS	see WATER DETERMINATION
KILNER JARS	see BOTTLES
KIPPS APPARATUS	see GAS GENERATORS
KNIVES,	
Cartilage	see DISSECTING
Cork cutting	see TOOLS
Glass cutting	see GLASSBLOWING TOOLS
Microtome	see MICROTOMES
Palette	see SPATULAS

MEASURES, Graduated	see MEASURES
MEASURING CYLINDERS	see CYLINDERS

Gallenkamp
REGD TRADE MARK

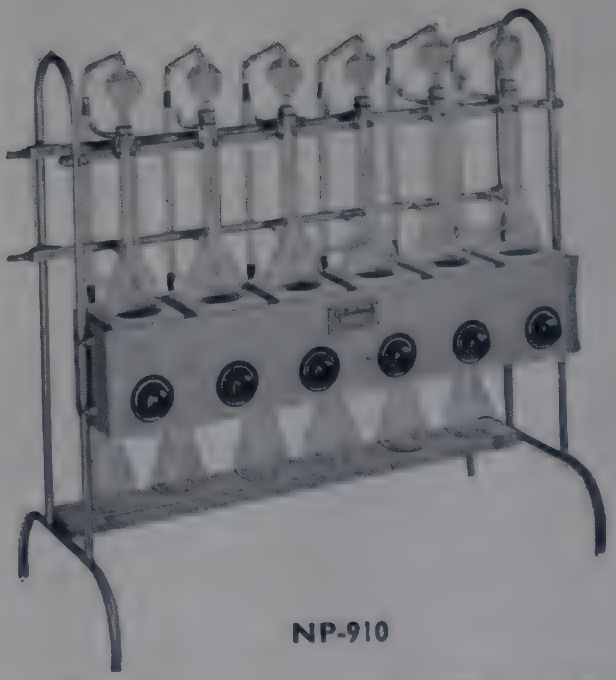
KJELDAHL EQUIPMENT

For the determination of nitrogen by the Kjeldahl method

MACRO and MICRO ASSEMBLIES

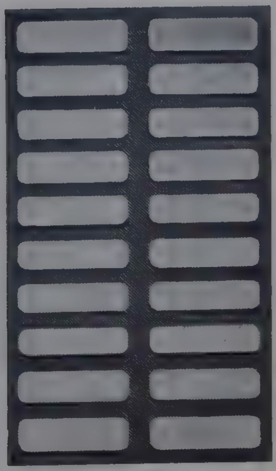
available for digestion and distillation with heating by either electricity or gas.

For full details and prices of the *Gallenkamp* range see entries under page heading **Nitrogen Determination.**

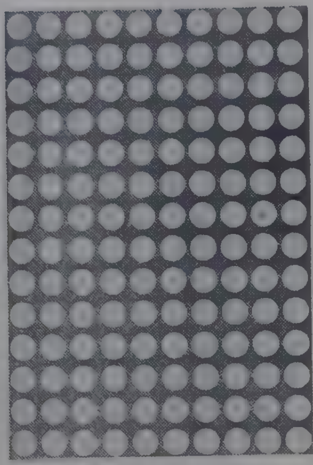


NP-910

MACRO ASSEMBLY FOR DISTILLATION



LB-130



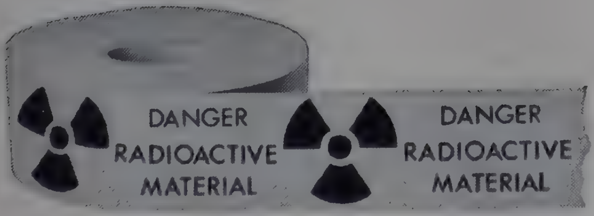
LB-135

STERILE
STERILE
STERILE

LB-150

POISON
POISON
POISON

LB-155



LB-160

WARNING!
DO NOT TOUCH

LB-165

LABELS

LB-120

LABELS, blank, self-adhesive white, in special boxes which dispense one label at a time. These labels adhere securely to most materials including plastics.

Size	12·5×24	23·5×49	25×63	25×75 mm	
Quantity	1000	500	500	500	
10 boxes	£5·20	5·60	12·00	13·00	cx
Box	£0·58	0·62	1·35	1·45	

LB-130

LABELS, blank, self-adhesive white, set out on sheets so that titles may be conveniently typed onto the labels. The labels adhere securely to most materials including plastics. Size 19×24·5 mm is suitable for use on microscope slides.

Size	19×24·5	19×63	35×44·5 mm	
Qty. in box	1000	500	500	
10 boxes	£8·60	6·40	7·40	cx
Box	£0·96	0·72	0·82	

HJ-833

LABELS for microscope slides. For details and price see entry in List No. sequence.

LB-135

LABEL, blank, self-adhesive, white, 8 mm diameter circular, set out on sheet of 140. In box of 25 sheets.

Box **£1·75** cx

LB-140

LABELLING TAPE, cellulose, opaque, self-adhesive with special white surface for writing on. In rolls of 65 metres.

Tape width	19	25 mm	
10 rolls	£6·80	8·60	cx
Roll	£0·76	0·96	

LB-150

LABELS, self-adhesive PVC tape with word 'STERILE' printed in blue on white ground. Size 50×12·5 mm wide, in 65 metre rolls.

10 rolls **£4·80** Roll **£0·53** cx

LB-155

LABELS, self-adhesive PVC tape with word 'POISON' printed in red on white ground. Size 50×12·5 mm wide, in 65 metre rolls.

10 rolls **£4·80** Roll **£0·53** cx

LB-160

LABELS, self-adhesive PVC, legend 'DANGER—RADIOACTIVE MATERIAL' with international radioactivity symbol in yellow and red. Size 70×25 mm, in 65 metre rolls.

10 rolls **£9·60** Roll **£1·06** cx

LB-165

LABELS, self-adhesive paper, legend 'WARNING! DO NOT TOUCH' in red on white ground. The label holds firm but can be peeled easily from any article when no longer required. In roll of 250 labels each 70×30 mm.

10 rolls **£7·20** Roll **£0·80** cx

LABELLED REAGENT BOTTLES	see BT-400 et seq.
LABELLING PENCILS	see PC-910 et seq.

LAMPS

*LH-250

LAMP, extending arm. An adjustable wall or bench mounting lamp with 12V, 21W bulb. A heavy base houses a mains transformer and OFF/DIM/BRIGHT switch and confers stability to the lamp even when the 40 cm telescopic arm is extended. Dimensions 17×7×6·5 cm when closed. For 220/240V a.c. single phase supplies only. Each **£5·64** *mx*

REPLACEMENT PART

LH-252 **Bulb, 12V, 21W** ... Ten **£1·30** Each **£0·20** *mx*

LH-250

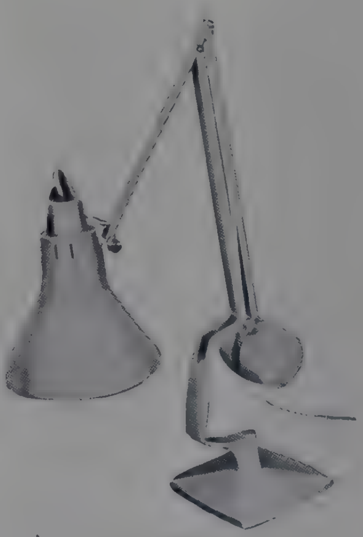
LH-300

LH-300

LAMP, *Anglepoise,* **counterpoised** giving light at any angle. With 75 cm long arm, adjustable to any position, and table base. For use with 60W B.C. fitting bulb. **Without bulb** ... ... Each **£7·40** *mx*

LH-305

LAMP, counterpoised, giving light at any angle. A 60 cm reach, with rolling weight counterpoised action giving adjustment even on a sloping surface. With table base. For use with 40 to 100W B.C. fitting bulb. **Without bulb** ... ... Each **£8·50** *mx*



LH-305

LH-330

LH-330

LAMP, fluorescent, with two 30 cm tubes in reflector housing adjustable in all directions. Flexible 'stayput' arm mounted on control unit and heavy base. Consumption 20W with light output equivalent to 75W tungsten lamp. For 230/250V a.c. supplies ... Each **£10·00** *fx*

Models for 100/115 and 200/220V available to special order.

REPLACEMENT PART

LH-332 **Fluorescent tube** ... ... Each **£0·55** *mx*

MICROSCOPE LAMPS

ML-802 et seq. *Olympus range*

MP-825 et seq. *Prior range*

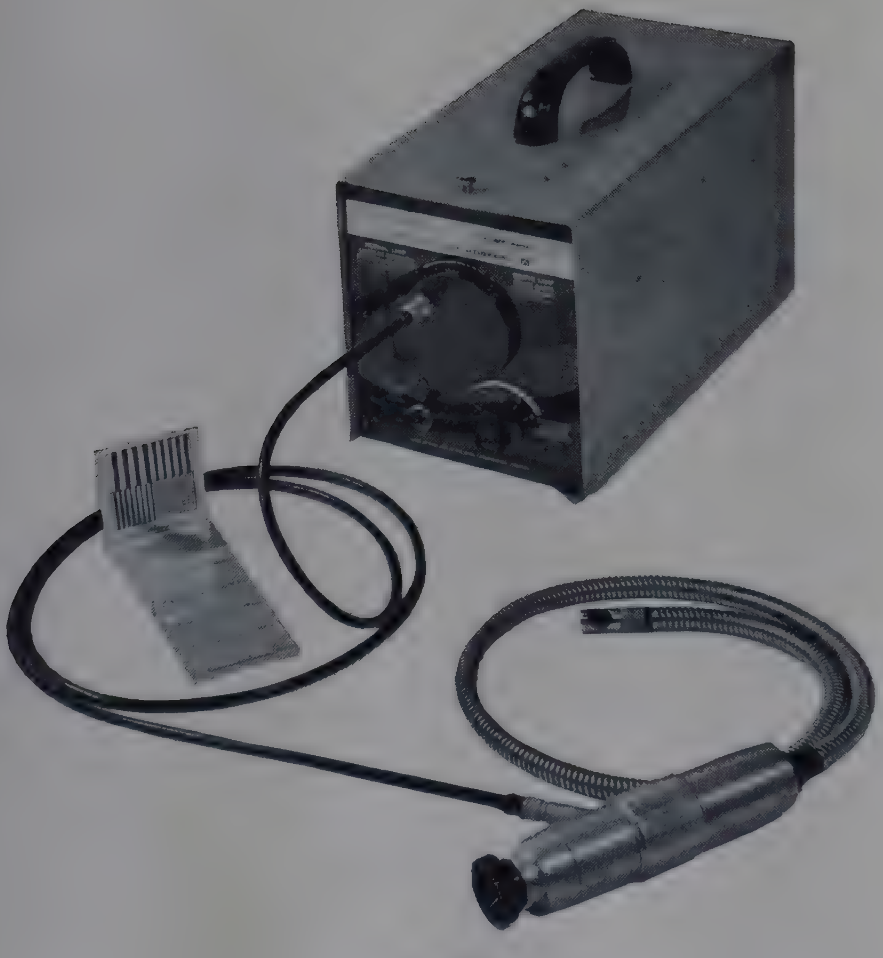
For details and prices see entries in List No. sequence.

ILLUMINATED MAGNIFIERS

See MA-830 and MA-854 in List No. sequence.

FIBRE OPTICS

- **High intensity 'cold' illumination for microscopy and biological purposes**
- **Remote monitoring of lamps**
- **Liquid or solid level monitoring**
- **Illumination in equipment where heating causes intolerable inaccuracies or drift**
- **Flame monitoring**
- **Inspection of assemblies**



LH-380

'Fibre optics' is the term used to describe a development which enables light to be transmitted along flexible fibres. Fibres are normally used in bundles and protected by a flexible sheath. If the grouping is random the bundles are known as light guides and are suitable only for transmitting light incoherently; if the grouping is coherent each fibre remains in the same juxtaposition with its neighbours along its entire length and images can be transmitted. Thus both light and images can be transmitted in other than straight lines, and remote or inaccessible subjects can be viewed.

OUTFITS

Low-power illuminator, battery operated. Enables light to be concentrated on very small areas without the use of complex lens systems. With 30 cm incoherent fibre optical light guide.

High-power illuminator. A mains operated source of high intensity light which emerges from the light guides at low temperature.

A rotary switch on the front panel can be set to any of five different illumination intensities. Also on the front panel are a mains ON/OFF switch and indicator lamp. A 90 cm flexible light guide is included with the illuminator.

Fibroscope. A remote viewing instrument comprising a viewing head with focusing eyepiece, a coherent fibre bundle and a transmitting light guide in a flexible armoured metal sheath, a focusing objective and the high power illuminator described above. Light from the illuminator passes down the light guide to illuminate the subject. Reflected light from the subject returns through the coherent fibre bundle and forms an image at the eyepiece. A right angle objective attachment is provided.

Focusing range of objective	3·3 mm to ∞
Eyepiece magnification	×6

LH-365

LOW-POWER ILLUMINATOR, as specification, comprising battery light source and flexible transmitting light guide ... ... Each **£3·60** *fx*

LH-370

HIGH-POWER ILLUMINATOR, as specification, comprising light source with 90 cm transmitting light guide and two lamps. For 200/250V 50/60 Hz single phase supplies ... ... Each **£52·70** *fxN*

ACCESSORY

LH-372 **'Y' Guide outfit,** comprising 'Y' guide and two 45 cm light guides ... ... Each **£15·80** *fxN*

LH-380

FIBROSCOPE, as specification, comprising high-power illuminator, flexible illuminating/viewing guide, viewing head and straight and right angle objective attachments. For 200/250V 50/60 Hz single phase supplies.
Each **£245·00** *fxN*

Gallenkamp DISCHARGE LAMPS

SODIUM LAMP

LH-400
SODIUM LAMP, *Gallenkamp*, suitable for spectroscopy, polarimetry, refractometry and interferometry. Comprises a 45W sodium discharge tube, housed in a metal shield with a 2·5 cm dia. aperture and mounted by means of a bosshead on an alloy rod at the rear corner of the control box. The transformer and ON/OFF switch are mounted within the control box which provides a stable base for the assembly.

For 200/250V a.c. supplies ... ... Each **£37·50** *bx*

REPLACEMENT PART
LH-402 Sodium discharge tube, 45W ... Each £4·85 *mx*

LH-400

ULTRAVIOLET LAMP FOR 365 nm

The 125W mercury discharge bulb is enclosed in an ultraviolet glass filter from which there is practically no visible light, 95% of the radiation being at 365 nm. The assembly is housed in an anodised aluminium reflector, mounted on an easily adjustable arm. The arm is pivoted from a metal case which houses a multitapped choke, making the whole a self-contained and portable unit. A carrying handle is fitted to the top of the case. The lamp is normally supplied with a voltage range of 200/250V 50 Hz only. Voltage tappings are provided in 10V steps, **and the exact supply voltage should be stated when ordering,** so that the equipment can be supplied in correct adjustment.

LH-530
LAMP, ultraviolet, *Gallenkamp*, portable, as specification, with peak output at 365 nm. Comprising 125W bulb with integral filter, reflector and adjustable arm mounted on power unit. For 200/250V 50 Hz supplies.
Each **£63·00** *bx*

REPLACEMENT PART
LH-532 Bulb, 125W, with integral filter ... Each £5·75 *cx*

When ordering please state exact voltage and frequency of supply.

LH-530

PHOTOCHEMICAL REACTOR

For small scale photochemical research using UV radiation

- **Incorporates medium pressure, 100W mercury lamp**
- **Flask capacity 1000 ml**

For details and price see PK-100 in List No. sequence.

ULTRAVIOLET LAMPS

LH-535

LH-535

LAMP, ultraviolet. With two 23 cm low pressure fluorescent tubes in reflector housing with Woods glass UV filter. Peak output at 365 nm. Adjustable by flexible 'stayput' arm mounted on control unit with heavy 18 cm base. Consumption 20W. For 220/250V 50 Hz supplies. Each **£18·00** *fx*

REPLACEMENT PART
LH-536 Spare fluorescent tube ... ... Each £1·30 *fx*

LH-540

LAMP, ultraviolet, *Hanovia 'Chromatolite'*, 80% of the output of which is at 254 nm wavelength. The quartz envelope of the cold cathode discharge tube is bent into a 30 cm long U-form and is mounted in a metal box housing, one side of which incorporates the fluorescence filters. The lamp housing is clipped to one face of the power unit which may be stood on any of the other five faces for irradiation of horizontal or vertical planes or for trans-illumination. In the position illustrated, the lamp box clears the bench by 10 cm. Net weight 6 kg. Power consumption 45W. Lamp life averages about 3000 hours without significant loss of output. For 200/250V 50/60 Hz supplies ... ... Each **£65·00** *fx*

REPLACEMENT PART
LH-542 Spare tube ... ... Each £18·70 *fx*

LH-540

HIGH INTENSITY ULTRAVIOLET SOURCE

The system comprises an optical chamber with 100W mercury lamp, reflector, filters and quartz lens and a cased power pack. It produces a high intensity beam of 10 mm dia. at a distance of either 120 mm or 300 mm depending upon the lens selected. Production of ozone by short wavelength UV is obviated by nitrogen flushing and removal of excess heat is by means of a water-cooled jacket.

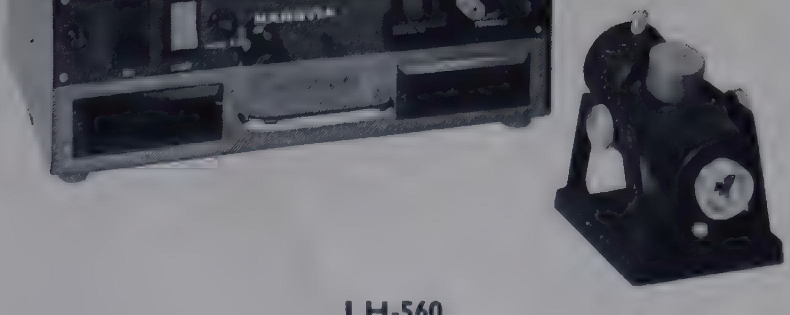
Radiation intensity varies from about 1·9 to 9·2 mW/cm² over the range 254 to 436 nm using 5 nm half-band width interference filters. **The very high intensity beam has applications in ESR spectroscopy, photochemical studies, fluorimetry, fluorescence microscopy and a number of other applications.**

The mercury compact arc lamp has an average life of about 300 hours with an intensity decrease of about 1% per 10 hours running.

LH-560

ULTRAVIOLET SOURCE, high intensity, *Hanovia* UV-100, as specification, comprising optical chamber with mirror and 120 mm focus lens, filter housing with provision for 10 mm liquid filter, 100W mercury arc lamp, six filters (Chance 0×1 and 0×7, two fused quartz and two borosilicate glass) and power pack for 200/250V 50 Hz single phase supplies ... ... Each **£310·00** *fxN*

Also available with 300 mm focus lens and for 110V 60 Hz supplies.



LH-560

UV IRRADIATION CABINET

- **Manufactured from clear Perspex**
- **Capacity approximately 40 litres**

For details and price see DK-640 in List No. sequence.

LIGHTERS

LV-020

LIGHTER, gas, battery operated, complete with battery and burner element. Nozzle length 13 cm. Suitable for towns (coal) gas ... ... Each **£1·05** *fx*

REPLACEMENT PARTS

LV-022	**Battery,** 1·5V. Type U14			Each	**£0·20**	*fx*
LV-024	**Burner element** ...	Ten	**£1·50**	Each	**£0·22**	*fx*

LV-020

LV-030

LIGHTER, gas, flint operated. Suitable for all fuel gases.
Ten **£10·00** Each **£1·12** *mx*

REPLACEMENT PART

LV-032 **Flints** for above. Pack of 12.
10 packs **£1·20** Pack **£0·19** *mx*

LV-030

LV-050

LIGHTER, gas, battery operated, produces a rapid succession of sparks between electrodes mounted near the end of an 11 cm nozzle when the trigger is pressed. Suitable for all common fuel gases including methane, butane and propane. **Requires but does not include a 1·5V battery** ... ... Each **£3·85** *mx*

Suitable batteries for use with the above are Ever Ready SP11, Vidor VII or Ray-o-Vac 1LP.

SPLINTS, wood, for igniting gases
see GD-320 in List No. sequence.

LV-050

LIQUID DISPENSERS

AUTOMATIC PIPETTE	see PM-764
BOTTLES	see BT-540 to BT-580
BURETTES	see BW-044 to BW-786
CARBOY ACCESSORIES	see CC-932 to CC-945
DILUTER	see ME-235
MEASURES	see MB-870 to MB-920
MEASURING CYLINDERS	see CY-104 to CY-298
PERISTALTIC PUMPS	see WM-200 to WM-260
PIPETTES	see PM-104 to PM-755
SYRINGES	see SY-410 to SY-430
WASHBOTTLES	see WB-100
WATER & CHEMICAL PUMPS	see WM-050 to WM-175

For details and prices see entries
in List No. sequence.

LOW TEMPERATURE APPARATUS

BATHS	see WF-720 and WF-721
CABINETS,	
front loading	see RJ-810 to RJ-826
top loading	see RJ-920 to RJ-940
HUMIDITY OVEN	see OV-700 to OV-852
ICE MAKERS	see IC-255 to IC-282
IMMERSION PROBES	see RJ-450 to RJ-458
INCUBATORS,	
fan convection	see IH-275 to IH-295
orbital	see IH-465 to IH-490
MICROTOME	see MR-600 and MR-602
STORAGE VESSELS	see VC-505 to VC-590
THERMOMETERS,	
electronic	see TK-010 to TK-070
liquid filled	see TJ-100 to TJ-174

For details and prices see entries
in List No. sequence.

LUBRICATING OILS AND GREASES

LX-100

LUBRICANT, oil, SAE 5W (approx.), a light grade machine oil, containing a corrosion inhibitor. In sealed 4 fl oz (113 ml) can with flexible spout.
Ten **£2·20** Each **£0·29** *cx*

LX-110

LUBRICANT, oil, SAE 10, a light grade oil suitable for lubricating sintered bronze bearings on small electric motors, etc. In can with spout, containing 10 fl oz (284 ml) ... ... Ten **£2·20** Each **£0·29** *cx*

LX-130

LUBRICANT, oil, SAE 20, *Edwards* No. 15, a medium grade oil containing multi-functional additives for general use in air ballast vacuum pumps, except in the quiet running models. In can of 1 gallon (4·5 l).
Each **£1·15** *fx*

LX-140

LUBRICANT, oil, SAE 30, *Edwards* No. 16, a medium grade oil, containing multi-functional additives, for quiet running vacuum pumps. In can of 1 gallon (4·5 l).
Each **£1·15** *fx*

LX-205

LUBRICANT, *Kilopoise* **medium,** a lubricant of extremely high viscosity at room temperature i.e. 1·8 kilopoise. It may be used to give smooth and easy motion to components such as oculars, focusing and adjusting screws, variable condensers, potentiometers and needle valves and has many other instrument applications. It acts as a corrosion inhibitor and sealing agent for both screw and plane contacts. In 2 oz (56 g) tube.
Each **£0·85** *cx*

LX-208

LUBRICANT, anti-scuffing, a dry lubricant consisting of a paste containing molybdenum disulphide. It may be applied to metal, plastics or fabric surfaces by rubbing with the finger, pad or brush. It provides dry lubrication for all types of mechanisms. In 2 oz (56 g) tube.
Ten **£9·80** Each **£1·10** *cx*

LUBRICATION OF BURETTE STOPCOCKS

Stopcocks on burettes or other items of volumetric glassware should NEVER be lubricated with a SILICONE grease. Silicone contamination distorts the shape of the meniscus, alters the amount of drainage and thus DESTROYS ACCURACY. Such contamination is very difficult to remove.

A rubber grease such as LX-210 is specially suitable for lubrication of stopcocks on volumetric glassware.

Vacuum greases for use in high vacuum work see VB-880 et seq. in List No. sequence.

LUBRICATING GREASES FOR GLASS APPARATUS

LX-210

LUBRICANT, rubber grease, soft, for general lubrication of stopcocks. In 2 oz (56 g) tin.
Ten **£2·00** Each **£0·27** *bx*

LX-220

LUBRICANT, rubber grease, medium, for vacuum stopcocks, desiccators, etc. In 2 oz (56 g) tin.
Ten **£2·00** Each **£0·27** *bx*

LX-225

LUBRICANT, Apiezon grease AP 101, a general purpose stopcock grease. Softening point 185°C. Suitable for vacuum use down to 10^{-1} torr. In 50 g tube.
Each **£1·00** *fx*

LX-235

LUBRICANT, silicone grease. Resistant to most chemicals, particularly alkali reagents, with great stability over a wide temperature range (−40 to 200°C). Practically colourless and non-poisonous. Suitable for high vacuum purposes and as a stopcock lubricant. **Must not be used for volumetric glassware** because silicone contamination distorts the shape of the meniscus and alters drainage allowances thus reducing accuracy. In 50 g tube.
Ten **£6·60** Each **£0·74** *cx*

LX-245

LUBRICANT, ptfe aerosol. A dry film lubricant and anti-stick agent. A dispersion of ptfe to which a non-toxic film-bonding agent has been added.

Lubrication.—Very low coefficient of friction over wide temperature range. Suitable lubricant for ground glass joints, glass or metal stopcocks.

Anti-stick uses.—Being chemically inert, insoluble and thermally stable up to 275°C, the lubricant is a useful anti-stick agent for glass joints.
In aerosol can containing 13¾ oz (390 g). Each **£0·90** *cx*

LUBRICANTS FOR ELECTRICAL CONTACTS

ELECTROLUBE is a chemically inert, water repellent, mechanica lubricant which has a low electrical resistance. It will clean and lubricate electrical contacts, switches, relays, potentiometers, sliding rheostats, motor commutators, etc.

It also acts as an arc and tarnish inhibitor and protects against atmospheric humidity. Can be used over a wide range of temperature (−45 to +200°C).

LX-260

ELECTROLUBE, electrical lubricant No. 1 for general laboratory purposes on low current, non-arcing contacts. In pocket dispenser with flexible capillary applicator ... ... Each **£0·45** *mx*

LX-263

ELECTROLUBE, electrical lubricant No. 2 for high current, arcing contacts. In 'snorkel' bottle of approx. 2 oz (56 g) ... ... Each **£1·25** *mx*

LX-265

ELECTROLUBE, electrical lubricant No. 2A-X for extensive application and waterproofing of high tension systems and is harmless to polystyrene, PVC, natural and synthetic rubbers. Aerosol in spray can containing 6 oz (170 g) ... ... Each **£0·63** *mx*

MAGNETS

MA-505

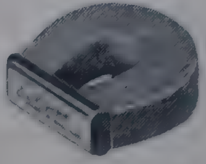
MAGNETS, bar, strongly magnetised tungsten steel, with keepers.

Length	10	15 cm	
10 pairs	**£5·20**	**7·60**	*cx*
Pair	**£0·58**	**0·84**	

MA-505

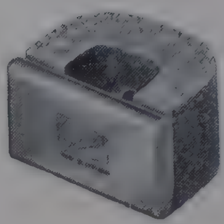
MA-510

MAGNET, pocket, '*Alnico*,' with keeper. Contact pull 2 kg. Overall height 25 mm, distance between poles 6·3 mm ... ... Ten **£3·00** Each **£0·36** *mx*


MA-510

MA-520

MAGNET, in '*Alcomax*', having greater magnetic field strength than tungsten steel permanent magnets. The magnet can be used for handling, lifting and sorting small ferrous parts, work-holding, and as the main component of electrical relays and magnetic filters. Overall height 29 mm distance between poles 19 mm, contact pull 14 kg ... ... Ten **£11·00** Each **£1·25** *mx*


MA-520

MA-530

MAGNET, high field strength, made from '*Alcomax*'. May be used for the magnetisation of other permanent magnets, testing materials for diamagnetism and paramagnetism, field plotting, demonstrating moving coil galvanometers, motors etc. Overall height 10 cm, distance between poles 4 cm or between removable pole pieces 2·7 cm ... ... Each **£14·05** *mx*

MA-530

MA-540

MAGNETS, laboratory set, made from '*Alnico*', comprising a pair of bar magnets of length 50 mm, a bridge magnet of overall height 23 mm, and a horseshoe magnet of overall height 35 mm, with keepers, in fitted wooden case ... ... Set **£2·60** *mx*

MA-540

Gallenkamp
REGD. TRADE MARK

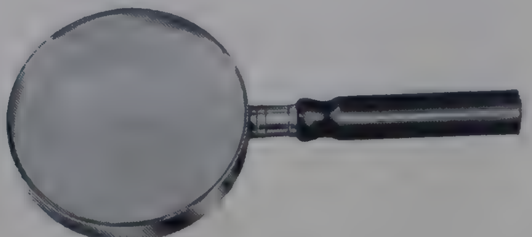
MAGNETIC STIRRERS

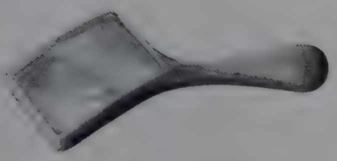
Compact variable speed stirrers, available with or without hotplate, which produce from gentle to vigorous stirring action suitable for:

- **Titrations**
- **Controlled precipitations**
- **Rapid preparation of solutions**
- **Agitation during electrochemical tests**
- **Agitation of sterile liquids**
- **Agitation within vacuum systems**

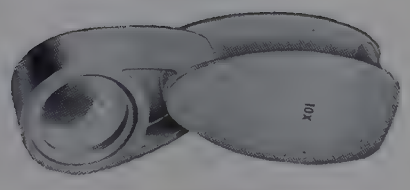
For details and prices see SS-660 et seq. in List No. sequence.

MA-660


MA-670


MA-700

MA-712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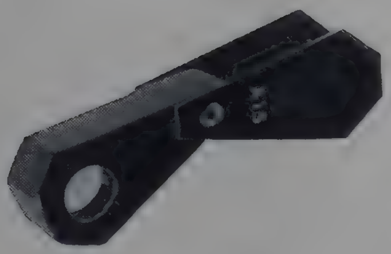
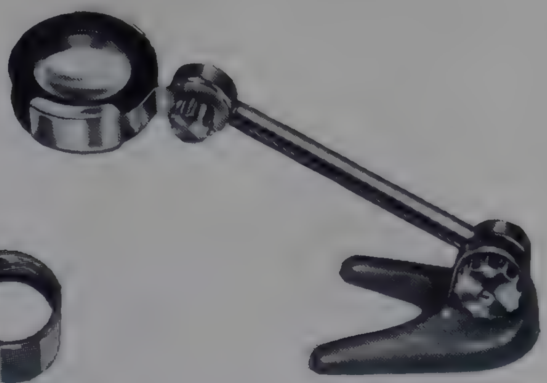
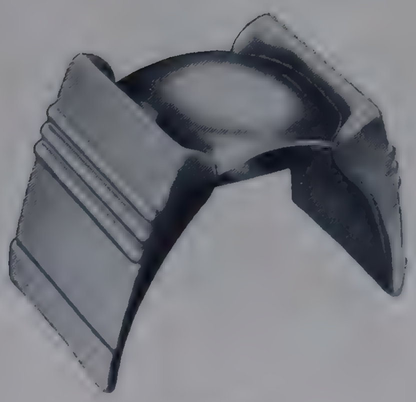
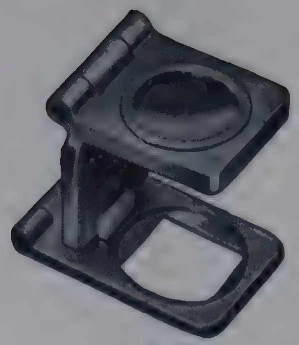

MA-740

MA-765


MA-795]


MA-805


MA-821

MAGNIFIERS

Important note. All magnifications quoted in this section refer to linear magnification, not area.

MA-660

MAGNIFIER, watchmaker's eye glass, magnification ×1·8. Plastics lens and mount.
Ten **£2·40** Each **£0·30** *mx*

MA-670

MAGNIFIER, lens dia. 60 mm, magnification ×1·5, with metal rim and plastics handle.
Ten **£11·60** Each **£1·30** *mx*

MA-700

MAGNIFIER, aspheric, with plastics lens 80×60 mm, magnification ×1·3, designed to give a good correction for distortion and field curvature, with plastics frame and handle ... ... Each **£4·00** *mx*

***MA-712**

MAGNIFIER, pocket type, black plastics frame with two lenses, dia. 25 mm, magnification of each lens separately ×2 or combined ×2·5 ... ... Each **£0·35** *mx*

MA-730

MAGNIFIER, aspheric, aplanatic pocket type, with folding plastics lens comprising an air-spaced doublet of magnification ×3·2 and aperture 18 mm, in plastics frame.
Each **£2·70** *mx*

MA-740

MAGNIFIERS, aplanatic, pocket type, in metal frame.

Magnification	×10	×15	
Aperture dia.	13	8 mm	
Each	**£4·90**	**5·50**	*mx*

MA-765

MAGNIFIER, illuminated. A powerful, hand magnifier fitted with 38 mm diameter lens, magnification ×8, and having built-in subject illumination powered by two U-11 batteries in the handle. Supplied with batteries and case.
Each **£6·75** *mx*

MA-795

MAGNIFIER, Falmer, with aperture 25 mm dia., magnification ×5, complete on adjustable stand with telescopic tubular arm and locking screws.
Each **£2·55** *mx*

MA-805

MAGNIFIER, aspheric, in plastics stand. Plastics lens 70×55 mm, magnification ×1·7 with head at a distance of 25 cm from lens. The small field curvature enables comfortable binocular vision over a wide field.
Each **£4·80** *mx*

MA-821

MAGNIFIER, linen tester, with bi-convex optically worked glass lens, magnification ×9, in folding plastics frame, with aperture 1×1 cm.
Ten **£3·20** Each **£0·38** *mx*

MAGNIFIERS

MA-830

MAGNIFIER, illuminated, with viewing head comprising a 12·5 cm diameter bi-convex glass lens, magnification ×1·4, and a circular cool fluorescent tube mounted on a spring balanced arm which has an extension of 110 cm. Magnification can be increased by fitting an auxiliary lens. Includes interchangeable brackets for wall or bench fixing. For 220/240V a.c. single phase supplies.

Each **£20·20** *mx*

When ordering please state voltage and frequency of mains electricity supply.

REPLACEMENT PART

CX-308	**Fluorescent tube,** circular, 22 watt. For price see entry in List No. sequence.

ACCESSORIES

MA-836	**Auxiliary lens,** diameter 10 cm. Increases magnification to ×1·7 ... ... Each **£3·75** *mx*
SM-526	**Clamp, G,** for clamping magnifier to the edge of a bench. For details and price see entry in List No. sequence.

MA-830

MA-854

MAGNIFIER, wide angle, illuminated, bench standing. The swivelling aspheric lens provides stereoscopic subject enlargement greater than ×2. Lens 165×100 mm, focal length 210 mm, maximum depth 215 mm. Lens height and angle are adjustable. Illumination is by two fluorescent tubes. For 220/250V a.c. supplies.

Each **£45·40** *mx*

THERMOMETER READING MAGNIFIERS, see TJ-900 and TJ-905 in List No. sequence.

MA-854

Olympus

LOW POWER STEREOSCOPIC MICROSCOPES.

For details and prices see ML-340 et seq. in List No. sequence.

MANIPULATOR GLOVE BAGS

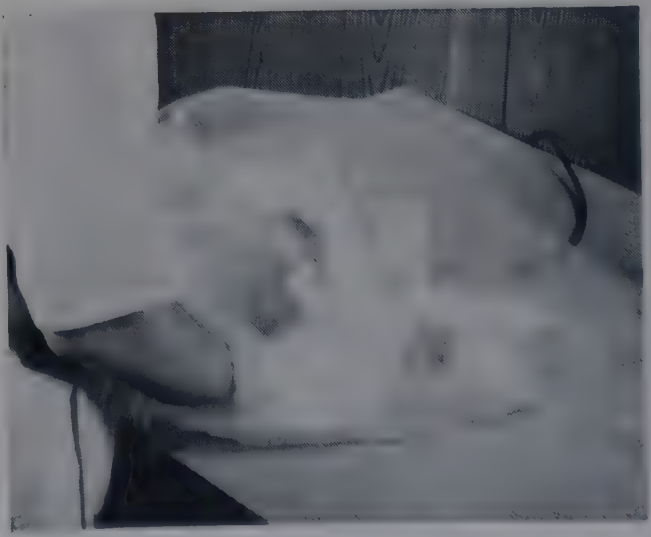
***MA-930**

GLOVE BAG, inflatable. A one piece flexible polythene bag with integral gloves. Suitable for a wide variety of applications such as grinding, handling of sensitive materials and gas sterilising where a dust-free, dry inert atmosphere is required. The bag can be re-used or easily disposed of if contaminated. Requires a source of compressed gas such as nitrogen to inflate the bag. Inflated work space 43×43×28 cm high. Entrance sleeve width 28 cm. In pack containing six glove bags and four spring clips for closing entrance sleeves ... Pack **£12·50** *mx*

***MA-934**

GLOVE BAG, inflatable. As MA-930 but with inflated work space 68×68×38 cm high. Entrance sleeve width 57 cm. In pack containing six glove bags and seven spring clips for closing entrance sleeves ... Pack **£23·50** *mx*

For other Glove Boxes see overleaf.

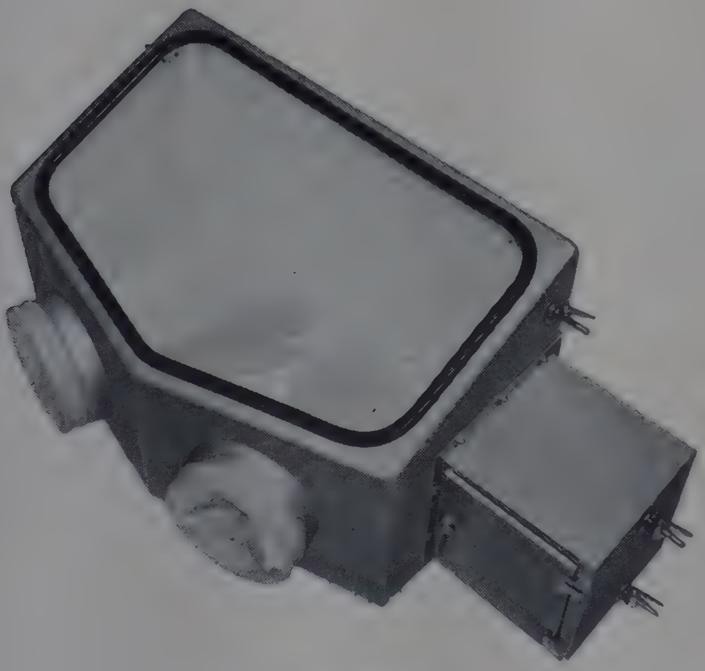


MA-930

Gallenkamp MANIPULATOR GLOVE BOX

For many applications where user and sample must be mutually isolated, including handling of bacterial colonies and low radioactivity isotopes.

- **Incorporates automatic air-lock loading hatch**
- **Easily cleaned interior**
- **Rapid glove replacement—optional range of sizes**
- **Suitably constructed for use with internal pressures slightly above or below ambient pressure**



MA-950

CONSTRUCTION

The box and loading hatch are made from heavy gauge steel sheet, rustproofed and stove enamelled. All the corners of the box are radiused to permit easy cleaning. Rubber feet are fitted to the base. The transparent acrylic plastics window is sealed in place by an air-tight gasket. Two glove ports at the front are fitted with ambidextrous rubber gauntlets held in place by stretching their beaded sleeve ends over the openings of the ports. Gloves are thus replaced easily and quickly but a double groove on each glove port prevents the gloves from being detached accidentally.

The loading hatch is in the form of an automatic air-lock with two air-tight doors interconnected by a neat interlocking mechanism to prevent either being opened until the other is correctly shut. Both the box and loading hatch are fitted with stopcocks for connection to dry air or inert gas supply. The box is supplied with an internal polystyrene tray 46×35 cm.

Toxic materials may be handled in dry powder form without danger from airborne particles. Hygroscopic substances can be handled without difficulty and operations where it is necessary to exclude air, or work under dust-free conditions, are possible with this apparatus.

Alpha emitters and/or purely beta emitters, for example C^{14} compounds, can be safely and conveniently handled in this apparatus and the health hazard associated with carrying out many radiochemical reactions and operations is reduced to a minimum. Operations involving grinding, stirring, filtering, gentle heating etc. may be carried out.

EXTERNAL DIMENSIONS

Manipulator box (excluding hatch)	69×45×42 cm high
Loading hatch	22×22×21 cm high
Loading hatch door	15×16 cm
Glove ports	16·5 cm dia.
Top window	61×37 cm max.
Maximum width	102 cm

MA-950
MANIPULATOR GLOVE BOX, *Gallenkamp*, as specification, supplied with two MA-955 latex gloves size 9. If alternative gloves required, please state List No. and size when ordering ... ... Each **£134·00** *bx*

ACCESSORIES AND REPLACEMENTS

MA-953 **Sleeve,** rubber, open ended, beaded at both ends to fit glove port and to seal on wrist allowing surgical gloves to be worn... ... Ten £11·00 Each £1·25 cx

MA-955 **Gloves,** gauntlet with beaded edge, ambidextrous, **natural latex.**

Size	7	8	9	10	
Per ten gloves	£18·00	18·00	18·00	18·00	cx
Per glove	£ 2·00	2·00	2·00	2·00	

MA-957 **Gloves,** as MA-955 but in **neoprene.**

Size	7	8	9	10	
Per ten gloves	£22·50	22·50	22·50	22·50	cx
Per glove	£ 2·50	2·50	2·50	2·50	

Glove size fitting measurements see instructions on page 134.

MANOMETERS

MB-020

MANOMETERS, (AG), for pressure or vacuum, on hardwood board, with scale graduated in mm up and down on opposite sides from the centre zero. For mounting on wall or cast iron foot MB-040, if required. **Without foot or mercury.**

Scale above and below zero	25	50 cm	
Each	**£7·80**	**8·50**	*bx*

MB-022 **Glass U-tubes,** spare, for MB-020.

Size	25	50 cm	
Each	£1·40	1·75	*ax*

MB-026

MANOMETERS, (AG), as MB-020, but graduated in 0·1 in with wider bore glass tube for use with water. **Without foot.**

Scale above and below zero	5	10 in	
Each	**£5·40**	**7·00**	*bx*

MB-028 **Glass U-tubes,** spare, for MB-026.

Size	5	10 in	
Each	£0·55	0·65	*ax*

MB-030

MANOMETER, (AG), single tube and reservoir pattern, on hardwood board, with sliding boxwood scale graduated 0–100 cm in mm. For mounting on wall or cast iron foot MB-040, if required. **Without foot or mercury.** Each **£10·70** *bx*

MB-032 **Glass part,** spare, for MB-030 ... ... Each **£1·45** *ax*

For suitable mercury see MF-932 in List No. sequence.

MB-040

FOOT, cast iron, for use with manometers MB-020, MB-026 and MB-030 ... ... Each **£4·00** *bx*

VACUUM MANOMETERS

MB-050

MANOMETER, Anschutz, (AG), with stopcock, on wooden stand with adjustable anodised aluminium scale, graduated 10–0–10 cm in mm. Supplied evacuated and filled with mercury to the stopcock, and therefore requires adjustment of the charge before use ... Each **£15·00** *bx*

MB-052 **Glass part,** spare, for MB-050, with stopcock, unfilled. Each **£2·80** *ax*

MB-054 **Glass part,** spare, as MB-052, but mercury filled. Each **£4·80** *ax*

MB-060

MANOMETER, Anschutz, (AG), borosilicate glass, as MB-050, with stopcock and **sintered glass seal** instead of closed end. Easily filled by adding a few ml of mercury to the funnel to produce a seal, and then by applying gentle suction to the funnel nozzle, mercury is introduced through the stopcock to fill the capillary. Air displaced from the capillary passes through the sintered plate. On wooden stand, with adjustable anodised aluminium scale graduated 10–0–10 cm in mm. **Without mercury.** Each **£13·00** *bx*

MB-062 **Glass part,** spare, for MB-060, with stopcock. Sintered plate dia. 10 mm ... ... Each **£3·40** *ax*

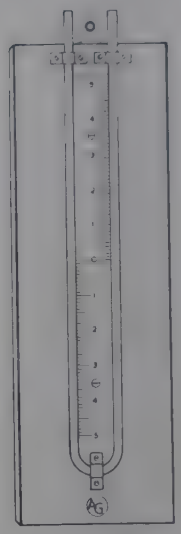
For suitable mercury see MF-932 in List No. sequence.

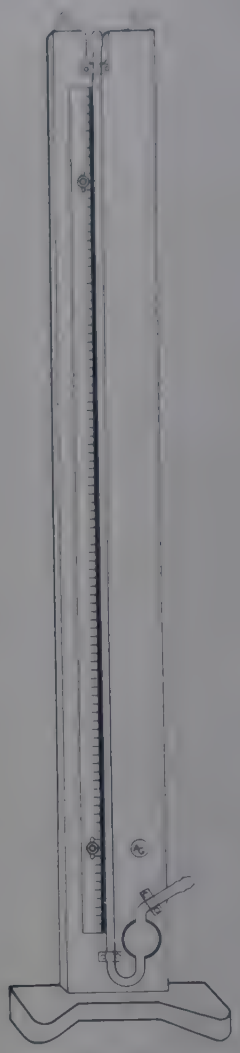
GJ-300

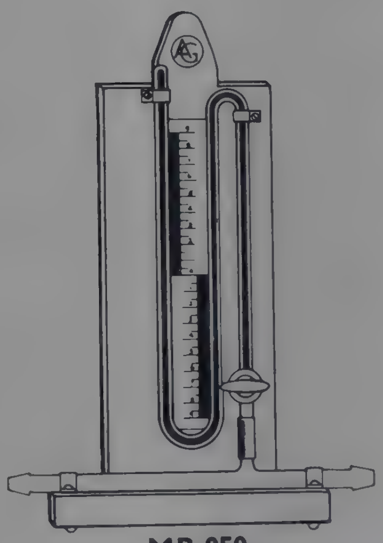
PRESSURE GAUGES, Bourdon tube pattern.

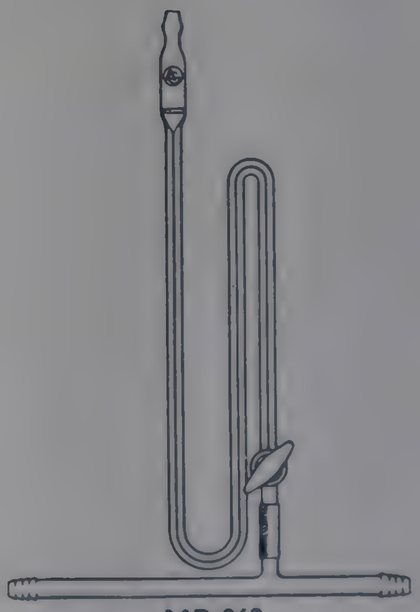
GJ-330

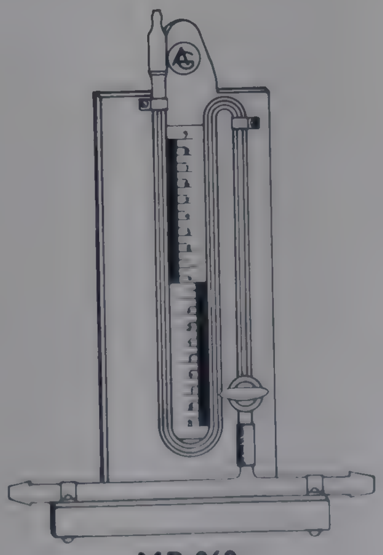
VACUUM GAUGES, Bourdon tube pattern. For details see entries in List No. sequence.

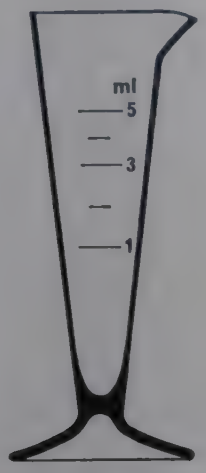

MB-020
MB-026


MB-030
with MB-040

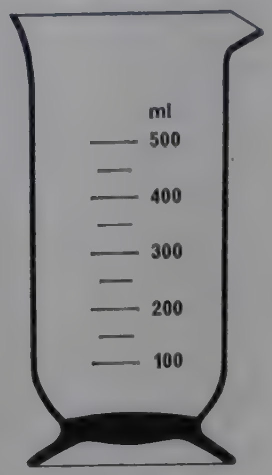

MB-050


MB-062

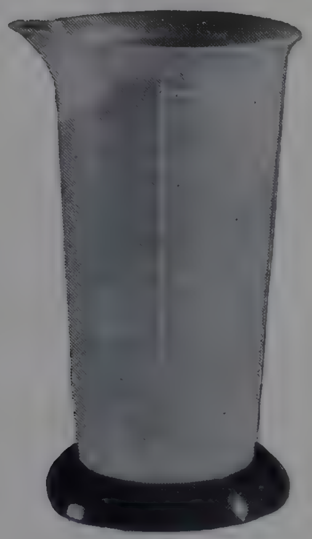

MB-060



MB-870



MB-875



MB-920

MEASURES

MB-870

MEASURES, graduated, Government stamped, conical form to BS 1922.

Capacity	5	10	25 ml	
Subdivided	1	1	5 ml	
Ten	£7·20	9·80	9·80	cx
Each	£0·80	1·10	1·10	
Capacity	50	100	250 ml	
Subdivided	5	10	25 ml	
Ten	£10·60	10·80	12·40	cx
Each	£ 1·18	1·20	1·40	

MB-875

MEASURES, graduated, Government stamped, beaker form to BS 1922.

Capacity	500	1000 ml	
Subdivided	50	100 ml	
Ten	£12·60	16·50	cx
Each	£ 1·40	1·85	

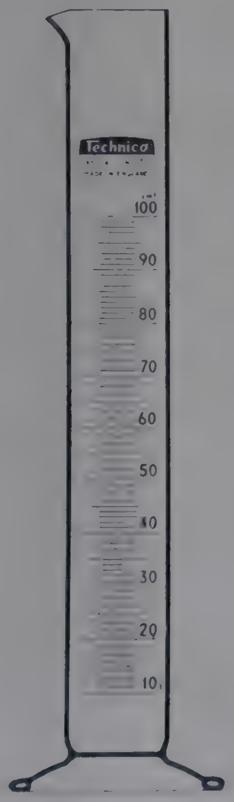
MB-920

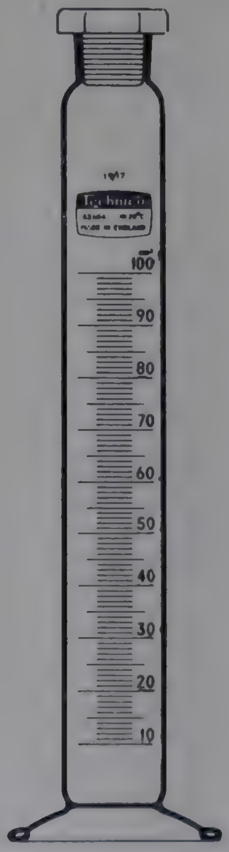
MEASURE, graduated polythene, conical form with two double scales graduated in 0–500 cm³ in 50 cm³ and 0–20 fl oz in 1 fl oz for right and left hand use. With detachable polythene foot.

Ten **£2·50** Each **£0·31** cx

Measuring jugs	see JV-100 et seq.
Measuring microscopes	see CD-500 et seq.
Measuring rules	see RX-021 et seq.
Measuring tapes	see RX-105

For details and prices see entries in List No. sequence.





Technico GRADUATED MEASURING CYLINDERS

REGD. TRADE MARK

Manufactured in our own factory to comply with the requirements of BS 604

- **With permanent graduations and inscriptions in amber stain**
- **Capacities 5 to 2000 cm³**
- **Available with works certificate of examination**

CYLINDERS with spout	see CY-104/105
CYLINDERS with stopper	see CY-244/245

For details and prices see entries in List No. sequence.

MEDICAL SCIENCES

A wide range of laboratory apparatus and instruments specifically required in **hospital, clinical** and **medical school laboratories** is listed alphabetically in this section.

More general apparatus used in medical laboratories appear elsewhere in the catalogue.

Useful cross reference lists are given below.

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CROSS REFERENCES TO ITEMS UNDER OTHER PAGE HEADINGS

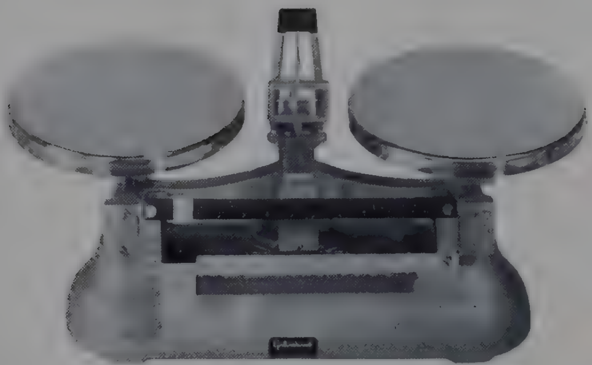
Agglutination baths	see	Water baths
Ampoule cutters	see	Glassblowing tools
Anaerobic apparatus	see	Culture apparatus
Bacterial incinerator		
Baskets for sterilising	see	Sterilisers
Blood alcohol	see	Quickfit apparatus
Blood storage cabinet	see	Refrigerators
Bottles, culture	see	Culture apparatus
general	see	Bottles
Boxes, sterilising	see	Sterilisers
Conway burette	see	Burettes
Colony counter	see	Culture apparatus
Cotton wool		
Culture dishes		
flasks		
tubes		
Dishes, Petri		
Embedding baths	see	Histology
Forceps	see	Dissecting equipment
Fraction collector	see	Chromatography
Glove boxes	see	Manipulator boxes
Micro burette	see	Burettes
Microscope slides and cover glasses	see	Histology
Petri dishes	see	Culture apparatus
Plates, agglutination etc.	see	Plates
Pumps, filter	see	Filter pumps
vacuum	see	Vacuum pumps
Racks, sterilising	see	Sterilisers
Roll tube equipment	see	Culture apparatus
Scalpels	see	Dissecting equipment
Scissors		
Staining equipment	see	Histology
Tally counters	see	Counters
Teats, rubber	see	Rubber sundries
Tubes, agglutination	see	Test tubes
Ultrasonic cleaners	see	Ultrasonics
Wasserman baths	see	Water baths
Wax dispenser	see	Histology

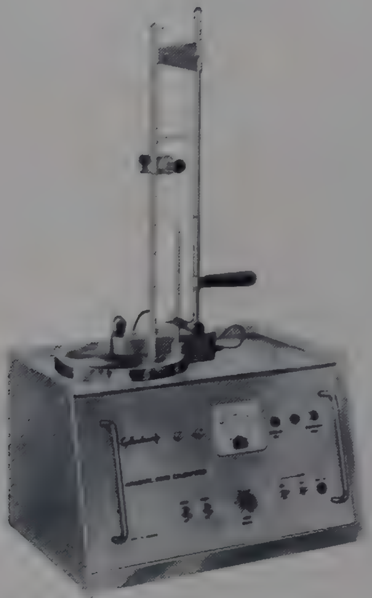
CATALOGUE PAGE HEADINGS UNDER WHICH APPARATUS OF MEDICAL INTEREST IS INCLUDED

Autoclaves
Calorimeters
Centrifuges
Chromatography
Cleaning materials
Clothing, Protective
Colorimeters
Culture
Dissecting
Evaporators
Filters
Flame analyser
Freeze drying
Furniture
Gas analysers
Histology
Incubators
Magnifiers
Manipulator boxes
Measures
Microscopes
Micromanipulators
Microtomes
Nitrogen determination
Ovens
Pipettes
Refrigerators
Sterilisers
Syringes
Ultrasonics
Washing and Drying
Water baths

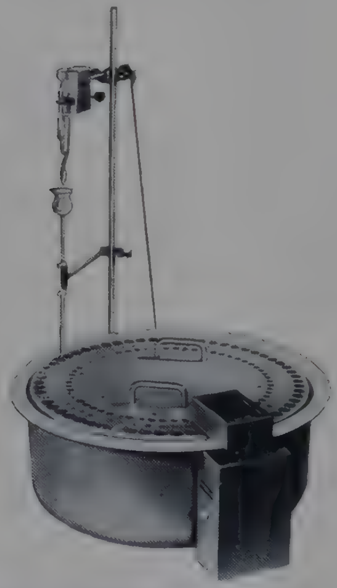
Gallenkamp APPARATUS
FOR
MEDICAL SCIENCES

Autoclaves—see AX-100 et seq.


Balances—see BC-110 et seq.

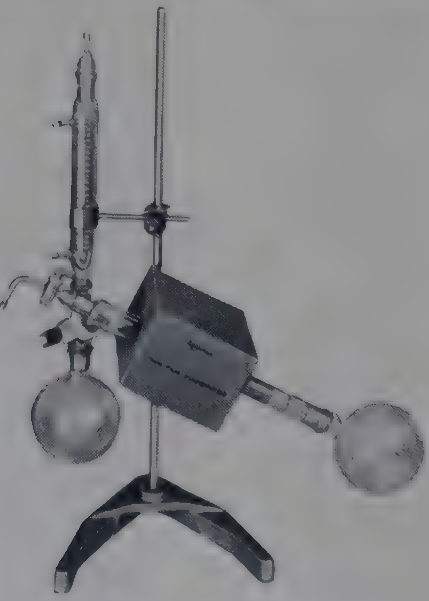

Calorimeters—see CB-100 et seq.

Centrifuges—see CF-405 et seq.


Fraction Collector—see CL-270 et seq.

Gallenkamp COLORIMETER
Colorimeter—see CS-200

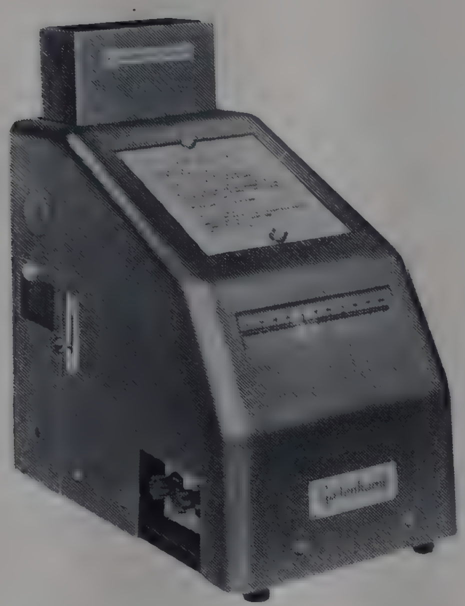
COLONY COUNTER
Colony Counter—see CX-300


Rotary Thin Film Evaporator—
see EU-100

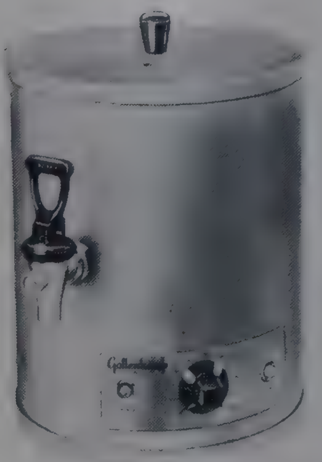
Membrane Filter Holders—
see FD-300 et seq.

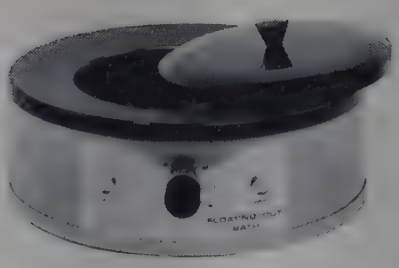
For details see entries in List No. sequence.

Gallenkamp APPARATUS
REGD TRADE MARK
FOR
MEDICAL SCIENCES


Flame Analyser—see FH-500

Gas Analysers—see GC-020 et seq.


Wax Dispenser—see HJ-145


Floating-out Bath—see HJ-190

Ovens and Incubators—
see OV-010 et seq.
and IH-100 et seq.

Orbital Incubators—see IH-460 et seq.

Manipulator Glove Box—see MA-950

Flask Shaker—see SD-110

Water Baths—see WF-360 et seq.

For details see entries in List No. sequence.

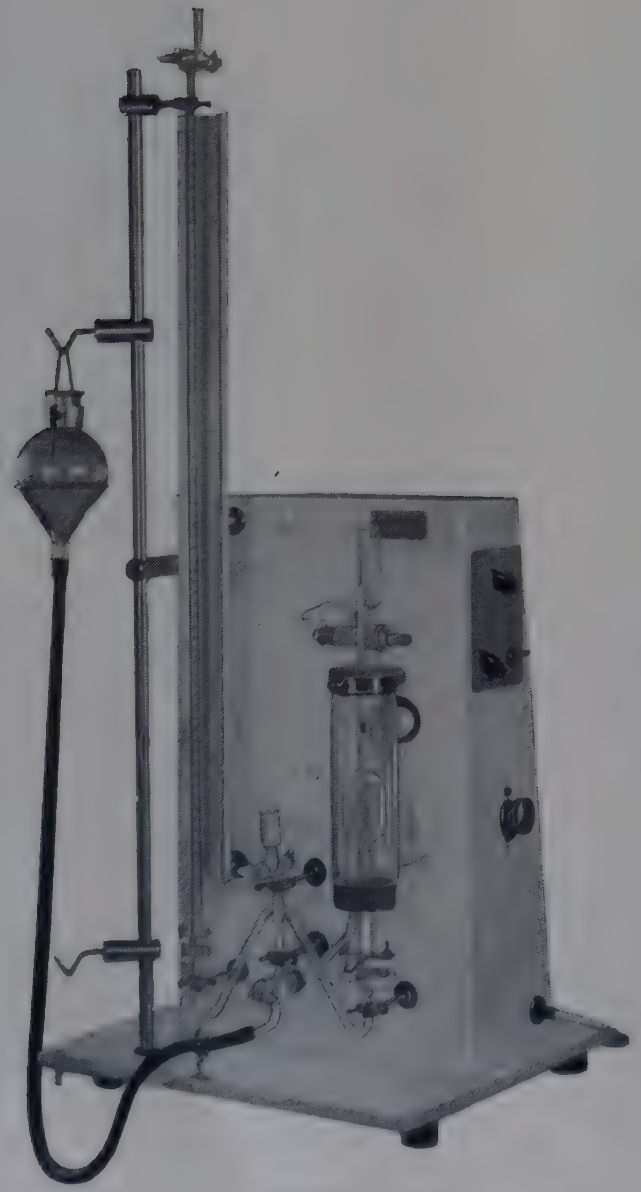
Gallenkamp VAN SLYKE APPARATUS

MANOMETRIC APPARATUS WITH MAGNETIC AGITATION

For the determination of gases in blood, plasma and urine, and other applications.

- **Interchangeable glassware, easily replaced**
- **Optional macro and micro reaction pipettes**
- **Built-in illuminator, timer and buzzer**

The original apparatus was devised by Dr. Donald D. Van Slyke and is fully described, together with detailed methods of use, in 'Quantitative Clinical Chemistry' Vol. 2 by Peters and Van Slyke. The *Gallenkamp* apparatus incorporates magnetic agitation and many other carefully tested refinements.



MC-500

DESCRIPTION

The apparatus stands on a mercury tray fitted with a drain plug. All glassware mounting clamps are adjustable and quickly removed for dismantling and cleaning the glassware. A lamp is fitted behind the reaction pipette for improved observation.

A motor driven magnet rotates a follower in the reaction pipette. The motor speed and position are adjustable to give optimum stirring conditions so that complete reaction normally occurs within three minutes.

The stout glass manifold, which connects with both manometer and reaction pipette by interchangeable spherical joints, has side tubes shaped to prevent gas bubbles being trapped at the bends. Large surface stopcocks provide good mercury control without the need for frequent regreasing.

The apparatus is fitted with a clockwork driven time switch, range up to 8 minutes, and a warning buzzer which sounds at the end of the timed period.

REACTION PIPETTES

The standard reaction pipette is graduated at 50, 2 and 0·5 cm³. It is mounted in a water jacket fitted with a thermometer. The funnel is graduated to 10 cm³ with 1 cm³ sub-divisions.

The Rappaport [1] [2] pipette for determinations of CO_2 in 0·1 ml blood samples, is interchangeable with the standard pipette. It is useful where normal quantities of sample are unobtainable (for example in paediatric cases) and comprises a reaction vessel with a 7 ml bulb containing a magnetic follower and a stem with a capacity of 0·4 cm³, sub-divided in 0·01 cm³. It is mounted in a water jacket fitted with a thermometer. The funnel is calibrated to 1·5 cm³ in 0·1 cm³.

MC-500

VAN SLYKE MANOMETRIC APPARATUS, *Gallenkamp*, as specification, fitted with standard reaction pipette assembly MC-504. Requires but does not include 3 kg mercury.

For 200/250V 50 Hz	Each	**£180·00**	*bx*
For 100/120V 60 Hz	Each	**£180·00**	*bxN*

MC-502

VAN SLYKE MANOMETRIC APPARATUS, *Gallenkamp*, as specification, fitted with **Rappaport** micro reaction pipette assembly MC-506. Requires but does not include 3 kg mercury.

For 200/250V 50 Hz	Each	**£176·00**	*bx*
For 100/120V 60 Hz	Each	**£176·00**	*bxN*

1. Rappaport, Eichorn and Nutman, J. Clin. Path., **9,** 1956, 166.
2. Rappaport, Eichorn and Nutman, Clin. Chim. Acta, **1,** 1956, 305.

Gallenkamp VAN SLYKE APPARATUS

CONVERSION ACCESSORIES

MC-504
STANDARD REACTION PIPETTE ASSEMBLY, to convert MC-502 into MC-500, comprising pipette MC-514, water jacket, thermometer TJ-380, rubber stoppers and supporting bracket, supplied with three magnetic followers ... ... Set **£17·00** *bx*

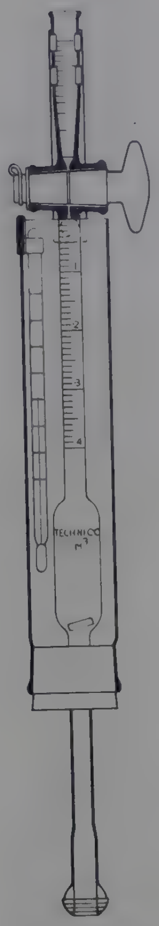
MC-506
MICRO REACTION PIPETTE ASSEMBLY, Rappaport, to convert MC-500 into MC-502, comprising pipette, water jacket, thermometer, rubber stoppers, supporting bracket and thermometer clip, supplied with three magnetic followers. Set **£13·00** *bx*

REPLACEMENT PARTS for MC-500 and MC-502

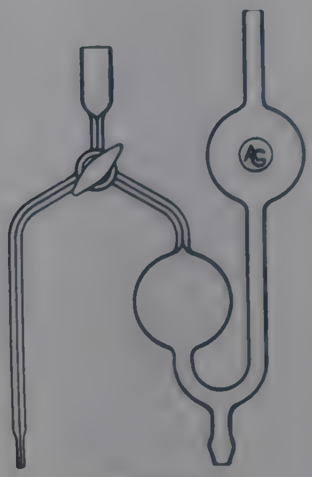
MC-510	**Manometer tube**	Each	**£6·50**	*ax*
MC-512	**Manifold**	Each	**£11·50**	*ax*
MC-514	**Reaction pipette,** standard	Each	**£8·25**	*ax*
TX-770	**Tubing,** PVC, 6·35 mm (125 cm reqd.) ...	For prices see entries in List No. sequence.		
TJ-380	**Thermometer,** 10° to 40°C for water jacket			
MF-920	**Mercury reservoir,** heavy glass, 250 ml.			
MF-378	**Lamp,** 15W			

ACCESSORIES

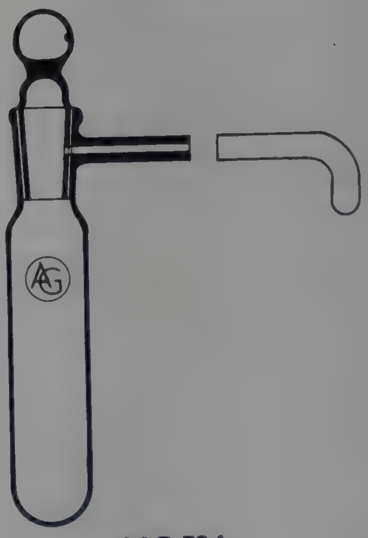
MC-521	**Gas pipette, Hempel-Van Slyke,** (AG), **borosilicate glass,** capacity 50 ml, for introduction of gaseous samples into Van Slyke gas analysis apparatus. Ten **£33·00**	Each **£3·70**	*ax*
MC-524	**Ninhydrin reaction vessel,** (AG), for the gasometric determination of free amino acids in blood filtrates by the ninhydrin—CO_2 method (Hamilton and Van Slyke, **J. Biol. Chem. 150, 1943**: 231). For use with MC-500 only	Each **£1·90**	*ax*
ME-340	**Pipettes, Ostwald-Van Slyke,** *Technico* 0·2 to 2 cm³	For details and prices see entries in List No. sequence.	
ME-342	**Pipettes, Ostwald-Van Slyke,** as ME-340 but with stopcock		
ME-344	**Pipettes, Ostwald-Van Slyke,** *Technico* three-mark pipette for Rappaport reaction pipette, 0·05 and 0·01 cm³		
ME-346	**Pipettes, Ostwald-Van Slyke,** as ME-344 but with stopcock		
MF-932	**Mercury,** triple distilled		
LX-110	**Lubricant,** suitable for stirrer motor ...		
WB-100	**Washbottle,** polythene		
VB-882	**Lubricating grease,** Apiezon-M, for stopcocks		
TJ-900	**Reader,** for manometer, ×5 magnification		



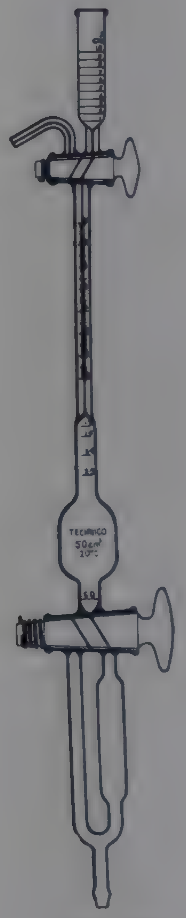
MC-506



MC-521



MC-524



MC-550

VOLUMETRIC APPARATUS

MC-550
BLOOD GAS APPARATUS, VAN SLYKE, volumetric, *Technico*, a simple apparatus for the determination of CO, CO_2 and O_2 in blood or blood plasma. **Without reagents** ... ... Each **£11·75** *ax*

ACCESSORIES

MC-521	**Pipette, Hempel-Van Slyke,** for use with MC-550 for the admission of gas samples to the top of the manometer bulb.
ME-340	**Pipettes, Ostwald-Van Slyke.**
ME-342	**Pipettes Ostwald-Van Slyke.**

For details and prices of the above see entries in List No. sequence.

Gallenkamp COLORIMETER

Gallenkamp COLORIMETER

For a wide range of colorimetric determinations with blood, urine and other body fluids in clinical and biochemical laboratories.

- Transistorised stabiliser circuit.
- Rapid response—stable readings.
- Mirror scale reads optical density direct.
- Polypropylene 3-position cell holder.
- Simple to operate and maintain.
- Optional flowthrough cell.

Accuracy—about 1% by direct reading; better with calibration curve.

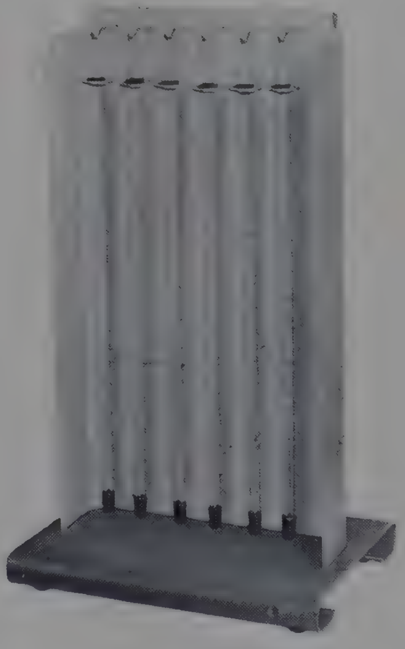
Stability—total drift over long periods less than 0·005 o.d. units after 10 minute warm-up period.

Sample heating—only about 5degC over a period of 2 hours.

Available with a range of colour filters, test cells, cell holders and adapters.

See CS-200 et seq. in List No. sequence.

MC-670


MC-670 with MC-675

MC-670

BLOOD SEDIMENTATION TUBE, Westergren, *Technico*. Overall length 30 cm with top zero graduated to 20 cm at the jet, subdivided in mm. The jet is externally ground to bevel so that the lowest 5 mm graduations do not appear. To BS 2554.
Ten **£2·00** Each **£0·26** *ax*

MC-675

METAL STAND, *Gallenkamp*, to suspend six Westergren tubes MC-670 or Wintrobe tubes MC-700. The tubes are suspended in hangers in such a way as to ensure that the axes of the tubes are vertical. The stand is made of stove enamelled aluminium sheet and is fitted with rubber feet. Six hangers with PVC grommets and six rubber policemen are provided ... ... Each **£5·75** *bx*

REPLACEMENT PARTS

MC-676	**Hanger,** with PVC grommet ...	Pack of 6	**£1·60** *bx*
RV-180	**Rubber policemen,** int. dia. 6 mm. For price see entry in List No. sequence.		

MC-700

BLOOD SEDIMENTATION TUBE, Wintrobe, *Technico*, capillary glass. Overall length 11 cm, graduated 0 to 10 cm in 1 mm divisions. To BS 4316, Fig. 1.
Ten **£3·00** Each **£0·36** *ax*

MC-705

HAEMATOCRIT SEDIMENTATION TUBE, Overall length 5 cm with top zero, graduated in mm to the jet which is ground to a bevel.
Ten **£5·40** Each **£0·60** *cx*

MC-752

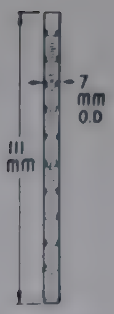
BLOOD SUGAR TUBE, Folin-Wu, *Technico*, graduated at 12·5 and 25 cm³. With 40 mm long, 8 mm diameter constricted tube leading to bulb of 4 ml capacity.
Ten **£5·70** Each **£0·64** *ax*

Q-BC11 with Q-MF 24/3/8

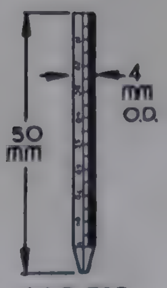
BLOOD UREA APPARATUS, Maclean, *Quickfit*, for estimation of urea in blood.

Q-2BC

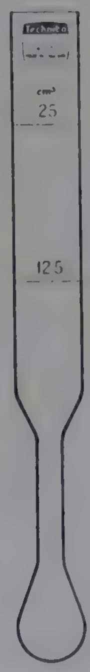
CAVETT FLASK, *Quickfit*, for the micro-scale determination of alcohol in blood.
For details of above items see entries under QUICKFIT APPARATUS.



MC-700



MC-705



MC-752

MICRO-HAEMATOCRIT CENTRIFUGE

This centrifuge is used for the determination of red blood cell volume by the micro capillary method using a speed up to 11,000 rev/min, equivalent to 12,000 g which reduces centrifuging time to a maximum of 5 minutes.

CONSTRUCTION AND CONTROLS

The centrifuge has a robust cast bowl and cover and is fitted with a quiet running universal motor which has permanently lubricated bearings.

A built-in automatic timer starts the centrifuge when set to the required period which may be between 1 and 14 minutes. Operating speed is reached within a few seconds of starting and a brake is fitted for rapid retardation when required.

MD-010

MD-010

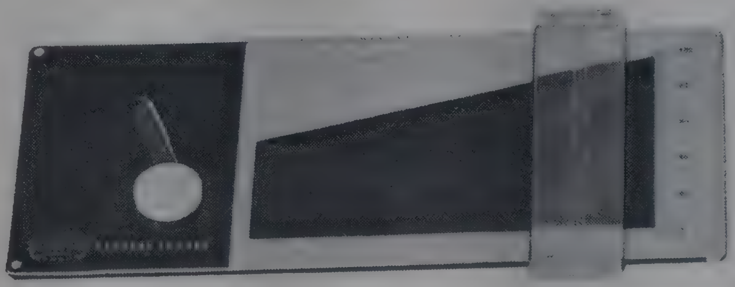
CENTRIFUGE, MICRO-HAEMATOCRIT, *Hawksley*, as specification with standard head which accepts up to 24 disposable micro capillary tubes in radial numbered slots without the necessity of balancing. The head is fitted with an inner cover to reduce windage and consequent vibration.

For 220/240V a.c. single phase supplies. Each **£75·00** *fx*

When ordering please state voltage and frequency of supply.

ACCESSORIES for standard head

MD-020	**Capillary tubes, heparinised,** 50 µl capacity, for use with direct capillary blood. In pack of 1000.	Pack	**£5·20** *mx*
MD-022	**Capillary tubes, plain,** as MD-020 but for venous blood. In pack of 1000	Pack	**£3·90** *mx*
MD-023	**Lancet, disposable,** for taking blood samples. Each lancet in sterile pack. In pack of 250 ...	Pack	**£1·50** *fx*



MD-055

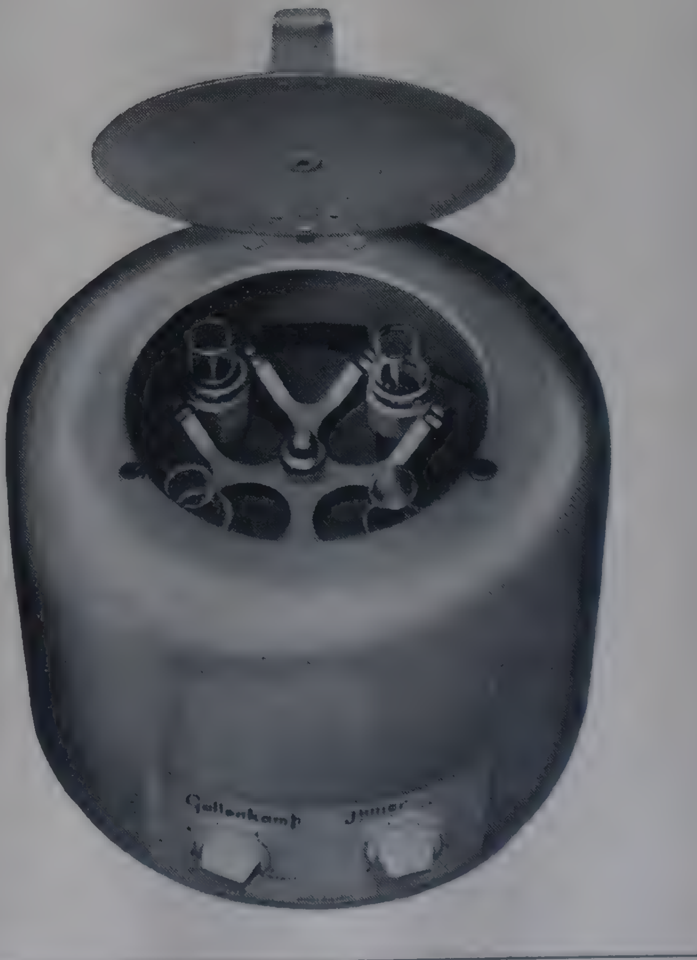
MICRO-HAEMATOCRIT READER

A precision capillary tube reader giving accurate readings of the percentage packed red cell volume.

A capillary tube is inserted in the carrier slot so that the base-line of the reader intersects the base of the red cells. The holder is moved so that the top line intersects the plasma-air interface. The angle of the cursor is adjusted until the white line intersects the red-white cell interface and then percentage packed red cell volume is read directly from the scale.

MD-055

MICRO-HAEMATOCRIT READER, as specification. Each **£5·00** *fx*



Gallenkamp CENTRIFUGES

REGD TRADE MARK

Semi-micro centrifuge—used in colleges and medical schools in lieu of filtration for small scale separations. See CF-200.

Laboratory centrifuge, maximum capacity 200 ml—a reliable centrifuge for routine use. The flexible mountings of the motor provide **a self-balancing action.** See CF-405.

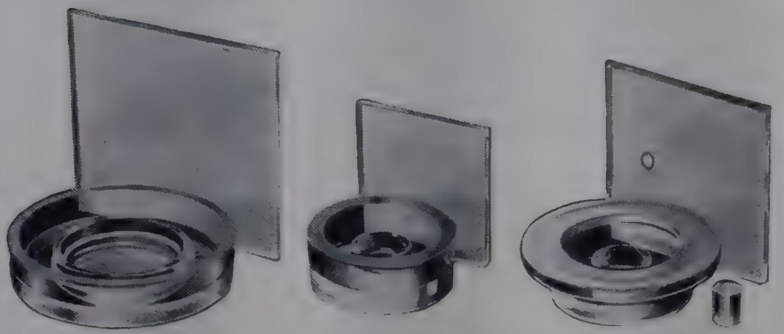
Laboratory centrifuge, maximum capacity 1000 ml—a robust, general purpose centrifuge with solid state speed control and many safety features. Suitable for routine and research applications. See CF-590.

For full details of the above see entries in List No. sequence.

MICRODIFFUSION ANALYSIS

The apparatus described is used for the analysis by microdiffusion of a wide range of organic substances, particularly proteins, enzymes and other metabolic compounds. The technique depends upon the absorption of a volatile component of the sample by an absorbing fluid which is later titrated.

MICRODIFFUSION DISHES



MD-120 MD-125 MD-130

MD-120

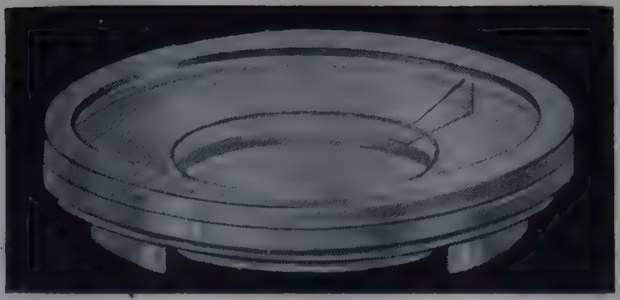
MICRODIFFUSION DISH, Conway No. 1. The original unit, 67 mm dia. with 70 mm square glass lid, for ammonia determinations in fluids from 0·0001 mg upwards and for determining a great variety of other substances in blood and body fluids. Ten **£3·50** Each **£0·41** *bx*

MD-125

MICRODIFFUSION DISH, Conway No. 2. 44 mm dia. with 46 mm square glass lid, particularly suitable for determinations of blood sugar but may also be applied to many other determinations using smaller quantities than the No. 1 unit can handle.
Ten **£4·70** Each **£0·52** *bx*

MD-130

MICRODIFFUSION DISH, Conway No. 2A. 58 mm dia. with ground flange 8 mm wide. The 60 mm square lid has a 5 mm dia. hole drilled 17 mm from one side for adding reagent. With two 10×10 mm glass cylinders. For precise micro carbon dioxide and bicarbonate determinations, and for blood sugar and many other microdiffusion analyses ... Ten **£7·60** Each **£0·84** *bx*

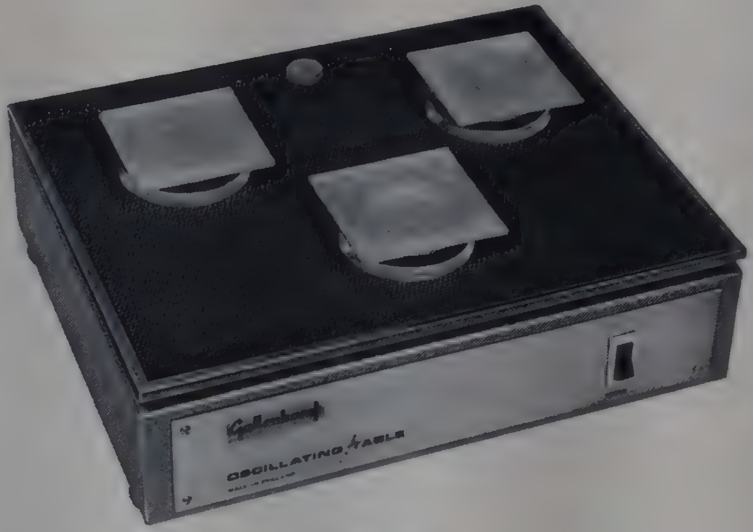


MD-140

***MD-140**

MICRODIFFUSION DISH, polystyrene, with drop-on lid. The dimensions of this semi-disposable unit have been designed to minimise the time taken for complete reaction. The material is sufficiently wettable not to require the use of a wetting agent. The thin, clear, colourless base makes the unit very suitable for absorptiometric techniques. Outside dia. 64 mm × max. internal depth 10 mm ... 20 **£4·70** Each **£0·31** *cx*

OSCILLATING TABLE



MD-160

OPERATION

The table comprises two glass plates, one supported above the other by three steel balls. When the uppermost plate, on which the dishes are placed, is deflected and released, it oscillates freely in all directions in the horizontal plane and slightly in the vertical plane. This produces the necessary agitation of the contents of up to twelve microdiffusion dishes.

CONSTRUCTION

The two glass plates each have three depressions in which the steel balls are centred. The lower plate is secured to a plinth which houses a small synchronous geared unit driven at 4 rev/min. An adjustable spring arm fixed to the gear unit periodically strikes a peg carried by the upper glass plate and thus sets the table in motion. The mechanism is completely silent and consumes only 6W. A combined ON/OFF switch and indicator lamp is mounted on the front panel. To prevent the dishes slipping off the table, the top plate is fitted with a rubber mat.

DIMENSIONS

Top plate	30×24 cm
Plinth	30×24×7·5 cm

MD-160

OSCILLATING TABLE, *Gallenkamp*, as specification. With spare steel balls. For single phase supplies.

For 200/250V 50 Hz ... ... Each **£35·00** *bx*

For 100/130V 60 Hz ... ... Each **£36·00** *bxN*

MICRO BURETTE

Recommended for use with microdiffusion dishes see BW-786 in List No. sequence.

Reference

'Microdiffusion Analysis and Volumetric Error' by Edward J. Conway, F.R.S., M.B., D.Sc.

HAEMACYTOMETERS

MD-200

HAEMACYTOMETER, to BS 748, with **rhodium coated** counting chamber giving bright lines against a neutral grey background. Double cell chamber with improved Neubauer ruling where the cell depth over the ruled areas is 0·1 ±0·001 mm. With plane cover glasses, one red and one white cell pipette each with tubing and mouthpiece, in case ... ... Each **£6·40** *mx*

MD-206

HAEMACYTOMETER, to BS 748, as MD-200 but with modified Fuchs-Rosenthal ruling, chamber depth of 0·2 ±0·001 mm and two white cell pipettes. Each **£6·40** *mx*

REPLACEMENT PARTS

MD-210 **Counting chamber, rhodium coated,** with improved Neubauer ruling, complete with cover glasses. Each **£4·00** *mx*

MD-216 **Counting chamber, rhodium coated,** with modified Fuchs-Rosenthal ruling, complete with cover glasses. Each **£4·00** *mx*

Pipettes and cover glasses, see below.

MD-220

HAEMACYTOMETER, to BS 748, comprising a BS single cell counting chamber with improved Neubauer ruling, with chamber depth 0·1 ±0·001 mm. Two plane cover glasses, one red and one white cell pipette each with tubing and mouthpiece, in case ... Each **£4·60** *mx*

MD-226

HAEMACYTOMETER, to BS 748, as MD-220, but with modified Fuchs-Rosenthal ruling, chamber depth of 0·2 ±0·001 mm and two white cell pipettes. Each **£4·60** *mx*

MD-230

HAEMACYTOMETER, to BS 748, comprising a BS double cell counting chamber with improved Neubauer ruling, two plane cover glasses, one red and one white cell pipette each with tubing and mouthpiece, in case. Each **£5·80** *mx*

MD-236

HAEMACYTOMETER, as MD-230, but with modified Fuchs-Rosenthal ruling and two white cell pipettes. Each **£5·80** *mx*

REPLACEMENT PARTS

Counting chambers, complete with cover glasses.

Type	Single			Double		
List No.	Ruling	Each	List No.	Ruling	Each	
MD-250	Improved Neubauer	£ **2·50**	**MD-260**	Improved Neubauer	£ **3·40**	*mx*
MD-256	Modified Fuchs-Rosenthal	**2·50**	**MD-266**	Modified Fuchs-Rosenthal	**3·40**	*mx*

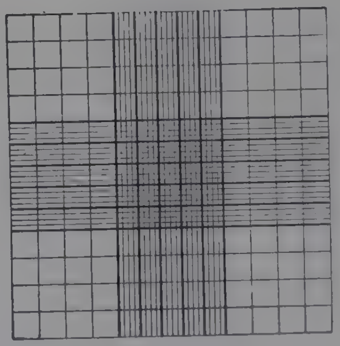
MD-274 **Cover glasses,** optically plane, for single cell counting chamber. Dimensions 16 × 22 mm, thickness 0·4 mm. Pack of 10 **£1·10** *mx*

MD-276 **Cover glasses,** optically plane, for double cell counting chamber. Dimensions 22 × 25 mm, thickness 0·4 mm. Pack of 10 **£1·10** *mx*

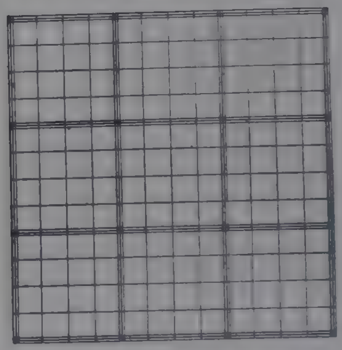
ME-347 **Pipette,** red cell, giving dilution 1 in 100 ... ... } For prices see entries in List No. sequence.
ME-348 **Pipette,** white cell, giving dilution 1 in 10... ... ... }

IMPROVED NEUBAUER
Depth 0·1mm
1/400 mm²
BS 748
GALLENKAMP ENGLAND

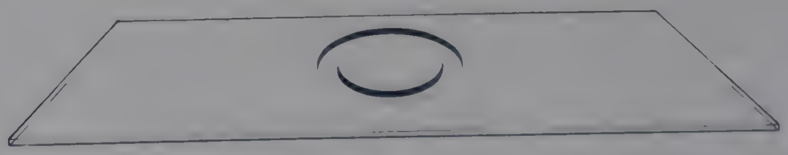
MD-200



Improved Neubauer Ruling



Modified Fuchs-Rosenthal Ruling



MD-320

MD-320

BACTERIA COUNTING CHAMBER, Helber, with circular cell depth of 0·02 mm, and Thoma ruling on a 1 mm thick slide. Suitable for dark ground illumination. With two 22 × 25 mm cover glasses in case. Each **£3·72** *mx*

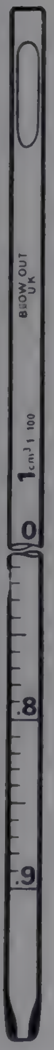
REPLACEMENT PART

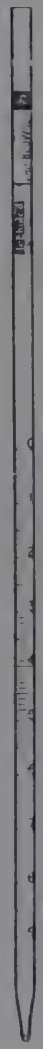
MD-276 **Cover glasses,** 22 × 25 mm. For price see entry in List No. sequence.

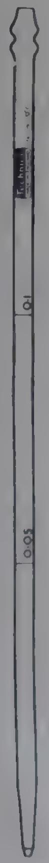
PIPETTES

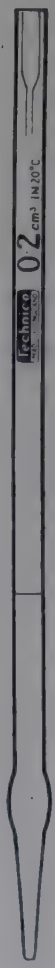
BS 3996 COLOUR CODE FOR PIPETTES

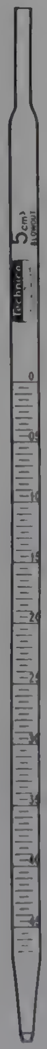
ME-260/262/270/292/430			ME-260/262/270/292/430		
Capacity cm³	Subdiv. cm³	Colour	Capacity cm³	Subdiv. cm³	Colour
0·05	0·0005	Green	2	0·02	Black
0·1	0·001	2-Green	5	0·05	Red
0·1	0·01	White	5	0·1	Blue
0·1	0·05	2-Orange	10	0·1	Orange
0·2	0·002	2-White			
0·2	0·01	Black	ME-300/320/330/340/342		
0·2	0·1	Orange	0·2	—	Red
0·5	0·005	Green	0·5	—	2-Black
1	0·01	Yellow	1	—	Blue
1	0·1	Red	2	—	Orange

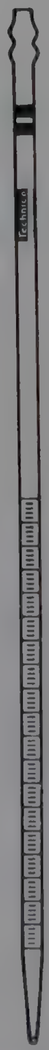

ME-250


ME-260


ME-292


ME-300


ME-262


ME-270

FOR SEROLOGICAL PURPOSES

ME-250

PIPETTES, serological, disposable, soda-lime glass. Capacity 1 cm³ subdivided 0·01 cm³. Accurate to within ±2%, flow time approximately 2 seconds. Sterilised during manufacture in dry steam at 134°C for 30 minutes. Supplied cotton plugged in pack containing 250 pipettes and one rubber teat. Each pipette is intended to be used once only ... ... 20 packs **£105·00** *mx*
10 packs **£55·00**
Pack **£6·00**

ME-260

PIPETTES, serological, *Technico*, with fast jet calibrated to tip for blow-out of last drop. Colour coded to BS 3996.

To deliver	0·1	0·2	1	1	2	cm³
Subdivided in	0·01	0·01	0·01	0·1	0·02	cm³
Flow time	3–5	3–5	4–8	4–8	4–8	sec
Ten	**£4·00**	**4·30**	**2·50**	**2·70**	**3·00**	*ax*
Each	**£0·45**	**0·48**	**0·31**	**0·34**	**0·36**	

ME-262

PIPETTES, serological, *Technico*, as ME-260 but with reduced diameter suction stem above the top mark. Colour coded to BS 3996.

To deliver	5	5	10	cm³
Subdivided in	0·05	0·1	0·1	cm³
Flow time	4–8	4–8	6–10	sec
Ten	**£2·80**	**2·80**	**3·00**	*ax*
Each	**£0·34**	**0·34**	**0·36**	

ME-350

PIPETTES, serological, *Corex*, strengthened glass. See entry in List No. sequence.

ME-270

PIPETTES, blood and opsonic index, *Technico*, with white enamel back and nipple fitting for rubber teat. Calibrated to contain an accurate volume of blood which must be completely washed out in use. Colour coded to BS 3996.

To contain	0·05	0·1	0·2	0·5	1	cm³
Subdivided in	0·0005	0·001	0·002	0·005	0·01	cm³
Ten	**£5·40**	**4·50**	**4·20**	**4·20**	**4·20**	*ax*
Each	**£0·60**	**0·50**	**0·47**	**0·47**	**0·47**	

ME-292

PIPETTES, blood sugar, *Technico*, graduated with two marks to contain, with white enamel back and nipple fitting for rubber teat. Colour coded to BS 3996.

To contain	0·1	0·2 cm³	
Subdivided at	0·05	0·1 cm³	
Ten	**£4·40**	**4·40**	*ax*
Each	**£0·49**	**0·49**	

ME-300

PIPETTE, Maclean, *Technico*, for blood sugar, with white enamel back, graduated to contain 0·2 cm³. Colour coded to BS 3996.

Ten **£4·80** Each **£0·53** *ax*

PIPETTES

ME-320

PIPETTES, Ostwald-Folin, to BS 773, *Technico,* calibrated to contain. Colour coded to BS 3996.

To contain	0·2	0·5	1	2 cm³	
Ten	**£4·80**	**4·80**	**5·10**	**5·30**	*ax*
Each	**£0·53**	**0·53**	**0·57**	**0·59**	

ME-330

PIPETTES, Ostwald-Folin, to BS 773, *Technico,* calibrated to tip for blow out of last drop. Colour coded to BS 3996.

To deliver	0·2	0·5	1	2 cm³	
Ten	**£4·80**	**4·80**	**5·10**	**5·30**	*ax*
Each	**£0·53**	**0·53**	**0·57**	**0·59**	

ME-340

PIPETTES, Ostwald-Van Slyke, *Technico,* to deliver between two graduations. For use with the Van Slyke apparatus. Colour coded to BS 3996.

To deliver	0·2	0·5	1	2 cm³	
Ten	**£9·00**	**10·40**	**11·00**	**11·40**	*ax*
Each	**£1·00**	**1·16**	**1·25**	**1·30**	

ME-342

PIPETTES, Ostwald-Van Slyke, *Technico,* as ME-340 but **with stopcock.** Colour coded to BS 3996.

To deliver	0·2	0·5	1	2 cm³	
Ten	**£13·00**	**14·40**	**15·00**	**15·50**	
Each	**£ 1·45**	**1·60**	**1·65**	**1·75**	*ax*

ME-344

PIPETTE, Ostwald-Van Slyke, three mark, *Technico,* for use with the Van Slyke apparatus. Graduated to deliver 0·05 or 0·1 cm³ between marks.
Ten **£10·20** Each **£1·12** *ax*

ME-346

PIPETTE, Ostwald-Van Slyke, *Technico,* as ME-344 but **with stopcock** ... Ten **£15·50** Each **£1·70** *ax*

ME-347

PIPETTE, haemacytometer, to BS 748. For red cells, giving dilution 1 in 100. Complete with mouthpiece and tubing ... ... Ten **£7·60** Each **£0·82** *jx*

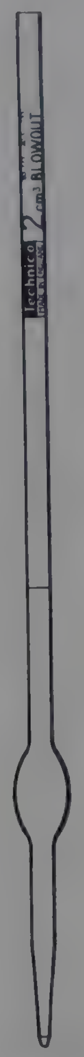
ME-348

PIPETTE, haemacytometer, to BS 748. For white cells, giving dilution 1 in 10. Complete with mouthpiece and tubing ... ... Ten **£7·60** Each **£0·82** *jx*

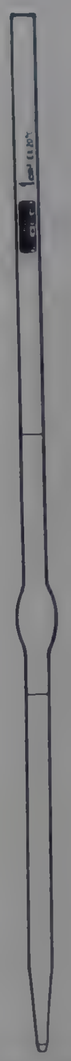
ME-349

PIPETTE, haemoglobinometer, with mouthpiece and rubber tubing. Capacity 20 mm³.
Ten **£3·40** Each **£ 0·40** *jx*

ULTRASONIC CLEANER for pipettes see UL-150 in List No. sequence.



ME-320
ME-330



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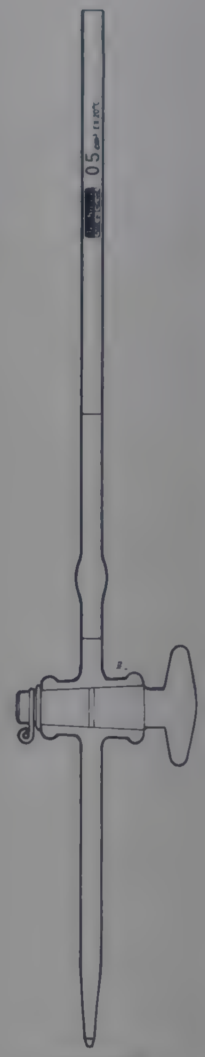

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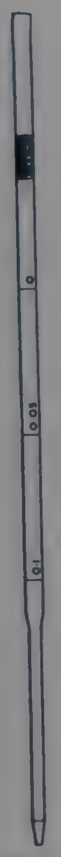

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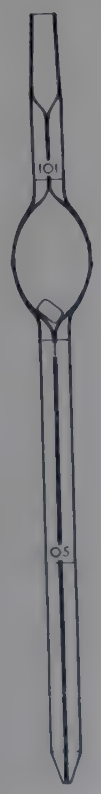

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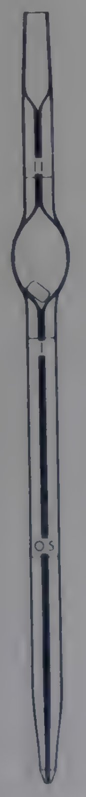

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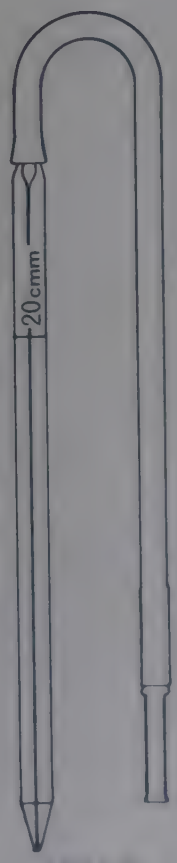


ME-349

COREX® PIPETTES

Manufactured by the Corning Glass Works, Corning, New York, U.S.A.

Corex® is the Corning U.S.A. trademark for laboratory glassware made from a special type of glass and treated by a chemcor ion-exchange process which strengthens the glass chemically so that it becomes many times stronger than ordinary glassware.

It has a greater surface hardness than ordinary glass and is so better able to resist the scratching and chipping which are a major cause of breakage and cross-contamination.

Corex is more resistant to chemical attack than ordinary borosilicate, will withstand steam sterilisation without visible clouding, and can be used up to 300°C.

Corex pipettes are manufactured to a very high quality to American specifications which are similar to the corresponding British Standards although there are some differences in sizes and a number of minor differences in dimensions and volumetric tolerances. In accordance with American practice, pipettes to class A accuracy are so designated, it being understood that other pipettes without designation are class B accuracy. Graduations and inscriptions are permanent and will remain legible throughout the life of the pipettes.

Gallenkamp is the appointed Distributor of Corex laboratory glassware in the United Kingdom.

***ME-350**

PIPETTES, short tip serological, *Corex* 7085A, with permanently marked graduations from zero line at top down to full capacity at tip of jet.

To deliver	0·1	0·2	1	1 cm^3	
Subdivided	0·01	0·01	0·1	0·01 cm^3	
12	**£14·50**	**16·00**	**14·10**	**16·00**	mx
Each	**£ 1·35**	**1·50**	**1·35**	**1·50**	
To deliver	2	2	5	10 cm^3	
Subdivided	0·1	0·01	0·1	0·1 cm^3	
12	**£16·00**	**21·00**	**22·00**	**22·60**	mx
Each	**£ 1·50**	**2·00**	**2·05**	**2·15**	

***ME-352**

PIPETTES, serological, cotton plug, *Corex* 7086A, with permanently marked graduations from zero line at top down to full capacity at tip of jet.

To deliver	0·1	0·2	1	1 cm^3	
Subdivided	0·01	0·01	0·1	0·01 cm^3	
12	**£17·00**	**17·60**	**16·10**	**17·60**	mx
Each	**£ 1·60**	**1·65**	**1·55**	**1·65**	
To deliver	2	2	5	10 cm^3	
Subdivided	0·1	0·01	0·1	0·1 cm^3	
12	**£16·40**	**23·10**	**22·00**	**22·10**	mx
Each	**£ 1·55**	**2·15**	**2·05**	**2·10**	

***ME-365**

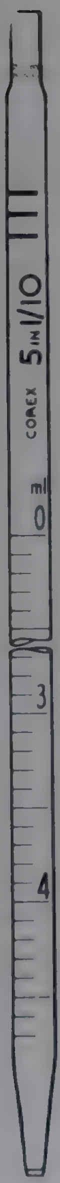
PIPETTES, serological, V.D.R.L., *Corex* 7093A, with permanently marked graduations. Short 20 cm pipettes for performing V.D.R.L. tests for syphilis and other tests using spot plate and ring agglutination slides. For delivery from zero line at top down to full capacity at tip of jet.

To deliver	0·5	0·5 cm^3	
Subdivided	0·01	0·05 cm^3	
12	**£19·25**	**17·10**	mx
Each	**£ 1·80**	**1·60**	

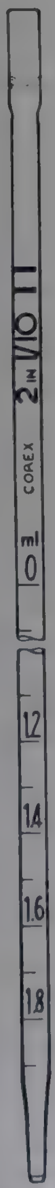
***ME-375**

PIPETTES, Ostwald-Folin, Class A, *Corex* 7105A, with permanently marked graduations.

To deliver	0·5	1	2 cm^3	
12	**£22·00**	**23·10**	**23·10**	mx
Each	**£ 2·05**	**2·15**	**2·15**	



ME-350



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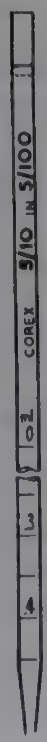

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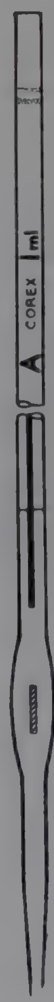


ME-375

COREX PIPETTES

Bulb (transfer)	see PM-460
Long tip	see PM-430
Mohr type	see PM-435

For details and prices see entries in List No. sequence.

PIPETTES

ME-380

PIPETTE, Dropping, (AG), **Dreyer,** with capillary tip and rubber teat ... ... Ten **£3·80** Each **£0·44** *ax*

RV-220 **Teats,** 0·8 ml capacity, spare for above, see entry in List No. sequence.

ME-400

PIPETTES, Kahn, *Technico*, calibrated to tip for blowout of last drop.

To deliver	0·2	0·25	0·45	1·5 cm³	
Subdivided in	0·001	0·0125	0·15	0·05 cm³	
Ten	**£4·90**	**4·40**	**4·80**	**4·40**	*ax*
Each	**£0·55**	**0·49**	**0·53**	**0·49**	

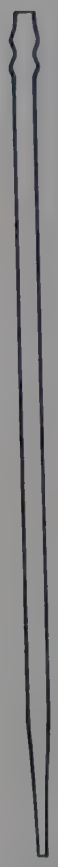
ME-430

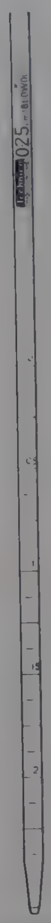
PIPETTES, Warburg, *Technico*, graduated with long jets, for use with Warburg flasks. Colour coded to BS 3996. For colour code see page 414.

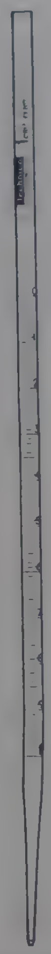
Capacity	0·1	0·2	0·5	1 cm³	
Subdivided in	0·001	0·002	0·005	0·01 cm³	
Ten	**£4·80**	**4·80**	**4·40**	**4·20**	*ax*
Each	**£0·53**	**0·53**	**0·49**	**0·47**	

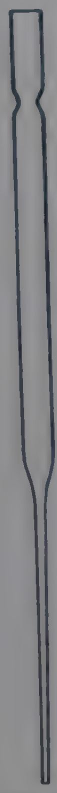
ME-436

PIPETTES, 0·02 ml, disposable. Precision break-off capillary tubes for accurate dilutions. In pack of 1000. Ref: Lewis & Benjamin, J. Clin. Path. (1965), **18,** 689. Pack **£12·45** *mx*


ME-380


ME-400


ME-430


ME-440

DISPOSABLE DOSING PIPETTES

These capillary Pasteur pipettes enable blood, serum and other biological fluids to be transferred under sterile conditions. They have a constriction in the neck to act as a stop for the cotton wool plug, and to facilitate their being carried horizontally when filled.

ME-440

DOSING PIPETTE, uncalibrated, short form, length 14·5 cm. With cotton wool plug. Approx. 30 drops per ml. In boxes of 250 . 4 boxes **£8·80** Box **£2·35** *mx*

ME-442

DOSING PIPETTE, uncalibrated, long form, length 22·5 cm. With cotton wool plug. Approx. 33 drops per ml. In boxes of 250. 4 boxes **£9·40** Box **£2·50** *mx*

AUTOMATIC DILUTER

For dilution of liquid samples with a reproducibility within ±1%. Uses a motorised glass/ptfe diluent syringe and a fluorocarbon sample syringe. Sample and diluent are discharged in turn through the delivery tube.

ME-445

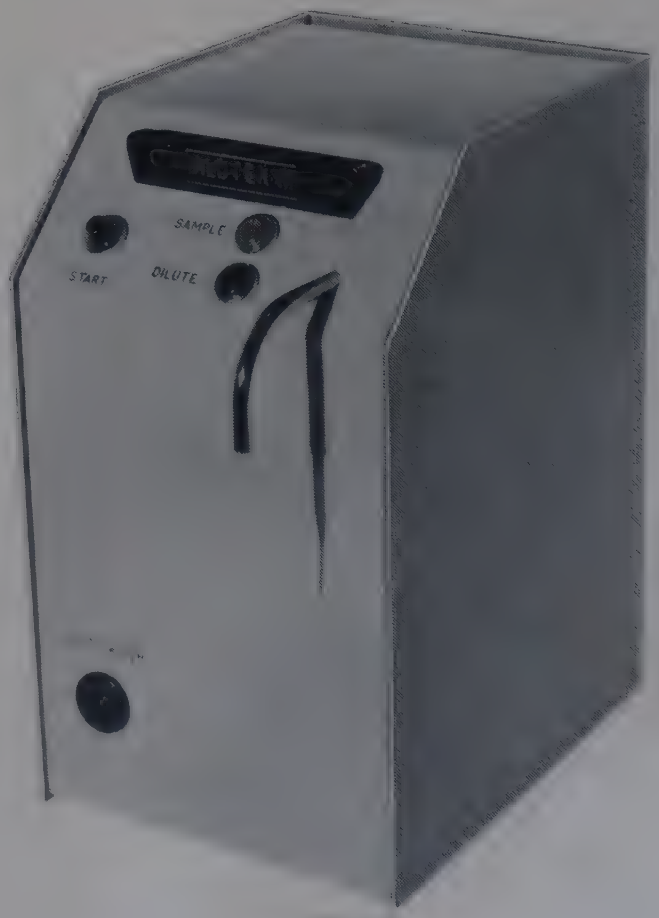
LIQUID DILUTER, automatic, *Diluter-III*, as specification with glass/ptfe diluent syringe and fluorocarbon valve and sample syringe. With press button for single cycle operation and adapter for connecting foot switch. Inlet nozzle requires 3 mm bore thin wall tubing. Overall dimensions 17×12×16 cm. Weight 4·5 kg.

Diluent syringe capacity	10 cm³ maximum
Sample syringe range	0·02 to 0·5 cm³
Deliveries per minute	up to 10

For 220/240V 50 Hz single phase supplies. Each **£85·00** *fxN*

REPLACEMENT PARTS AND ACCESSORIES

PM-766	**Foot switch assembly**	For prices see entries in List No. sequence.
PM-769	**Syringes,** glass, 5 and 10 cm³ for diluent	
TX-772	**Tubing,** PVC, 3 mm bore	



ME-445

Gallenkamp PROTEINOMETER STANDARDS

ME-450

ME-450

PROTEINOMETER STANDARDS SET, *Gallenkamp*, for the turbidimetric estimation of albumen in urine, CSF and other body fluids. Comprises 10 sealed and labelled albumen standards covering the range 10 to 100 mg/100 ml and 5 sample tubes. These tubes of 1 cm internal diameter are mounted in a comparator block which has an anodised aluminium plate with a central black band running the whole length of the plate to aid the visual comparison of sample and standard. Supplied with one 1 ml and one 3 ml dropping pipette attached to the wooden block by spring clips, and cover with anodised instruction plate.
Without sulpho-salicylic acid ... Each **£9·50** *bx*

REPLACEMENT PART

ME-452 **Tubes,** sample, for above. In pack of 10.
10 packs **£3·40** Pack **£0·40** *cx*

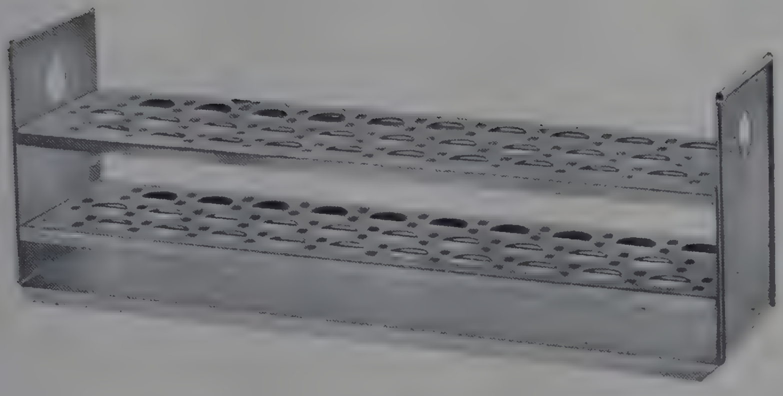
Reference: E. J. King and H. Wiggins, 2nd International Congress of Biochemistry, Paris, 1952, Resumé de Communications, p. 352.

AMPOULE FILE

ME-470

AMPOULE FILE, flat shape ... Per 1000 **£2·50** *cx*

AMPOULE CUTTERS, see glass tube cutters GP-175 and GP-180 in List No. sequence.



ME-482

KAHN RACK

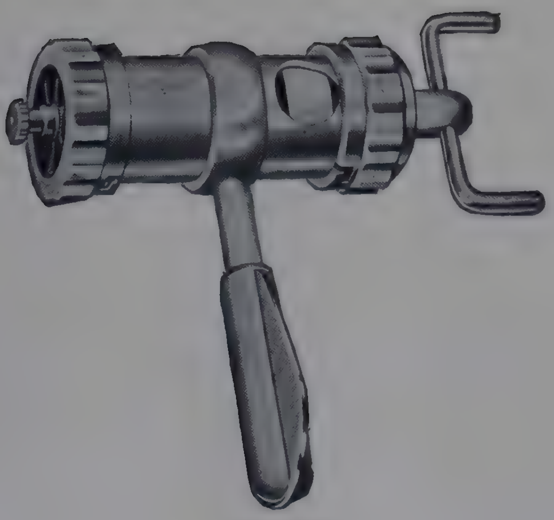
ME-482

KAHN RACK, *Gallenkamp*, stainless steel, with 30 holes 14 mm dia. to take Kahn or culture tubes which are held in position by wire springs. These racks may be used in shaking machines for Kahn tests or vertically in incubators with culture tubes. Dimensions 7·5×27·5×10 cm high.
Ten **£29·00** Each **£3·20** *bx*

Kahn rack shaker see SD-270 in List No. sequence.

Kahn test tube see TF-104 75×12 mm in List No. sequence.

ME-550



ME-560

TISSUE GRINDERS

ME-550

TISSUE GRINDERS, (Homogenisers) (AG), comprising glass cup with projecting tube and glass plunger. Cup and plunger are ground internally and externally respectively and there is a very small clearance at the sides and end when fitted together.

Overall length approx.	180	225 mm	
Ground zone, length approx.	40	50 mm	
Ground zone, diameter approx.	7	11 mm	
Ten	**£16·00**	**26·00**	*ax*
Each	**£ 1·80**	**2·90**	

Q-BC15P with Q-BC15/150

HOMOGENISER, *Quickfit*, see entry under QUICKFIT APPARATUS.

ME-560

TISSUE GRINDER, to take about 50 ml. Comprises a tubular body closed at one end by a perforated plate and a piston. The piston, propelled by a screw, forces the contents through the perforations into the path of revolving knife ... ... Each **£23·50** *mxN*

MIXERS, EMULSIFIERS AND HOMOGENISERS for blending, liquefying, grinding, disintegrating and emulsifying small quantities of material—see MU-660 et seq.

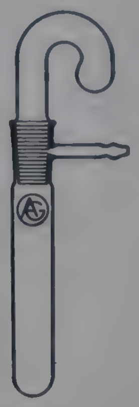
TUBES

ME-630

TUBE, Thunberg, (AG), **Keilin** modification with hollow stopper for addition of reagent. Capacity 10 ml. Each **£1·20** *ax*

Thunberg tubes see also *Quickfit* Q-BC31/1 et seq.
Bacteriological test tubes see TF-128.
Dreyer agglutination tube see TF-123.
Kahn tube see TF-104 75 × 12 mm.

For details and prices see entries in List No. sequence.



ME-630

ME-650

SAMPLE CONTAINERS

ME-650

CARTON, plastics, with press-on cap. For collecting samples for TB tests. Capacity 150 ml approximately. In pack of 100... ... ... Pack **£1·40** *cx*

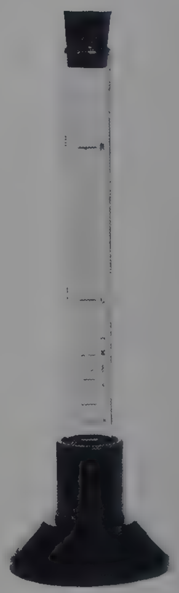
OTHER SAMPLE CONTAINERS will be found under headings **BOTTLES, CULTURE, JARS** and **TUBES** in alphabetical sequence in the catalogue.

URINE TESTING

ME-695

ALBUMINOMETER, Esbach, for estimating the amount of albumen in urine. Comprises graduated glass tube, plastics cover and base Ten **£3·80** Each **£0·44** *cx*

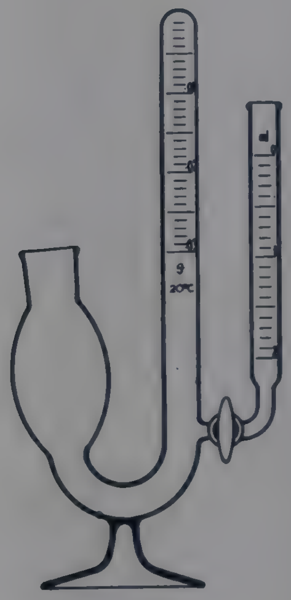
REPLACEMENT PART
ME-700 **Glass tube, graduated.** Ten **£1·00** Each **£0·17** *cx*



ME-695
without cover

ME-715

UREOMETER, Doremus-Hind, for the estimation of urea in urine by the hypobromite method. From the side tube, which is graduated from 0 to 2 cm³ in 0·1 cm³, urine is transferred to the closed vertical tube where it reacts with a solution of sodium hypobromite. Nitrogen is liberated and measured in the closed tube which is directly calibrated both to 0·03 g urea/100 cm³ urine in 0·001 g divisions and to 0·5 grains urea/100 cm³ urine in 0·01 gr divisions. Mounted on a glass foot ... Each **£3·60** *cx*



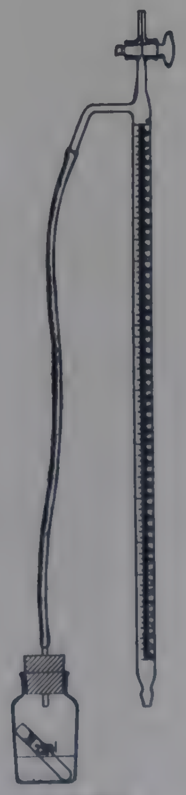
ME-715

ME-725

UREOMETER, *Technico,* **Maclean,** for the estimation of urea by the hypobromite method. Comprises bottle with mark at 25 cm³, test tube with mark at 5 cm³ and a 50 cm³ gas burette subdivided in 0·1 cm³ fitted with stopcock and side tube ... ... Each **£2·00** *ax*

ACCESSORY
MF-920 **Reservoir,** 150 ml. For price see entry in List No. sequence.

Reference: Practical Clinical Biochemistry by H. Varley. 1963.

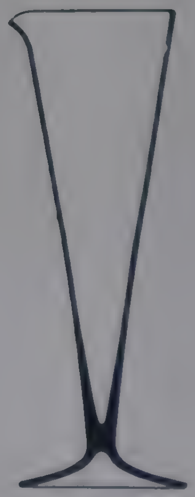


ME-725

ME-740

URINE TEST GLASSES, conical shape, with spout.

Capacity	125	200	300 ml	
Ten	**£3·40**	**3·80**	**5·00**	*cx*
Each	**£0·40**	**0·44**	**0·55**	



ME-740

WASHING AND DRYING

Bottle and pipette washers, draining racks, glassware dryers	see	WD-050 et seq.
Cleaning cloths and liquids	see	CM-510 et seq.
Ultrasonic cleaners	see	UL-150 et seq.

WASTE DISPOSAL

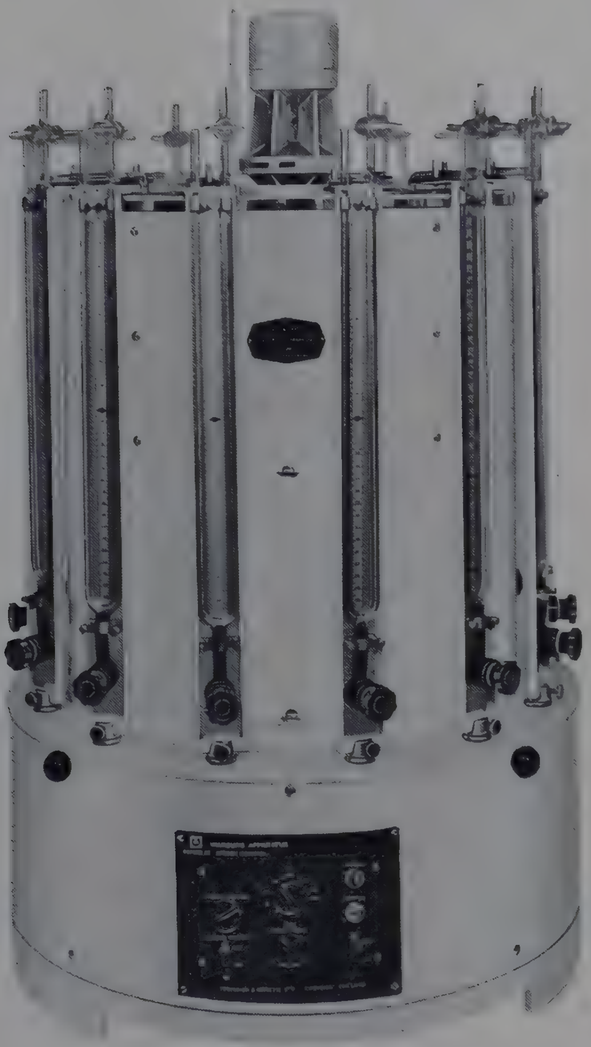
Bins	see	WD-400/425
Sacks and holders	see	WD-440 et seq.

For details and prices see entries in List No. sequence.

WARBURG APPARATUS

For the measurement of tissue respiration rates and enzyme activities.

- **Rotating body accepts 13 manometers**
- **Temperature controlled to within ±0·01degC**
- **Adjustable speed and stroke of manometers**
- **Automatic boost heating**



ME-800
ME-805

The apparatus comprises a circular tank around the edge of which are mounted thirteen manometers in stainless steel holders. The manometers are oscillated by means of a drive mechanism, the speed and stroke of which are adjustable. Any single manometer can be stopped for examination or adjustment, without affecting the others, merely by holding it. The main body of the apparatus rotates on ball bearings, power supplies being connected through slip rings to give completely unrestricted rotation.

The control and circulation system, together with the heaters, form a central lift-out unit, leaving the outside of the tank unobstructed.

Temperature sensing is by a thermistor bridge which provides minimum fluctuation, rapid heating without overshoot and rapid temperature recovery. The temperature is set by adjusting a knob on a direct reading scale, with final correction on a fine adjustment knob.

Energy to the heaters is switched by a plug-in solid state device.

Photosynthesis model

For photochemical work, a glass bottom is fitted to the tank and underside lighting by thirteen tungsten filament lamps is provided. A cooling coil is fitted to the tank and, for work in high ambient temperatures, refrigeration may optionally be fitted.

TECHNICAL DATA

Tank capacity	14 litres
Speed control	0–130 strokes/min
Stroke	13–51 mm
Maximum temperature	60°C
Temperature fluctuation	±0·01degC at 37°C
Power rating (max)	1250W

DIMENSIONS AND WEIGHT

Manometer holders	4·5×1·0×53·5 cm high
Complete apparatus, overall	56 cm dia.×91·5 cm high
Net weight	41 kg

ME-800

WARBURG APPARATUS, T. & M., as specification, with auto-boost and thermistor bridge control. Includes 13 standard manometer holders but **without glassware.**

For 220/240V 50/60 Hz supplies	Each **£662·50** *fxN*
For 110/120V 50/60 Hz supplies	Each **£662·50** *fxN*

ME-805

WARBURG APPARATUS, T. & M., **photosynthesis model,** as ME-800 but with 13 tungsten filament lamps and cooling coil. **Without glassware.**

For 220/240V 50/60 Hz supplies	Each **£874·50** *fxN*
For 110/120V 50/60 Hz supplies	Each **£874·50** *fxN*

When ordering please state voltage and frequency of supply.

ME-812

ACCESSORIES for ME-800 and ME-805

ME-812	**Bench stand,** for supporting 7 standard manometers when removed from the bath	Each **£10·00** *fxN*
ME-814	**Cooling coil,** with stand and mounting rod.	Each **£15·05** *fxN*

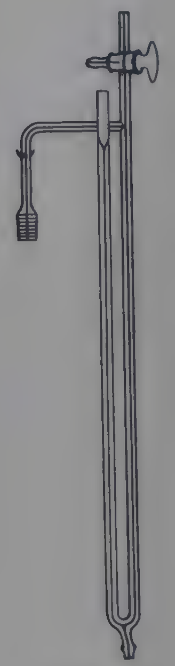
WARBURG GLASSWARE

Regd.

- Suitable for use with ME-800 and ME-805
- Fully interchangeable
- Borosilicate glass throughout
- Manometers and flasks fitted with hooks for joint retaining springs

ME-830
MANOMETER, Warburg, Ⓐ, with capillary bore. Fitted with 3-way stopcock and 14/15 cone for connecting flask... ... ... Set of 13 **£80·00** Each **£6·80** *ax*

NOTE: The joint for flask connection is fitted with hooks for spring connectors. One pair of spring connectors JR-140, 38 mm is required for each manometer to support either of the flasks listed below.

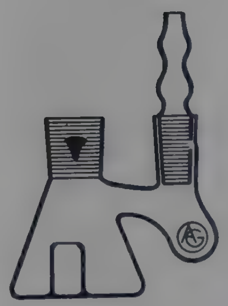


ME-830

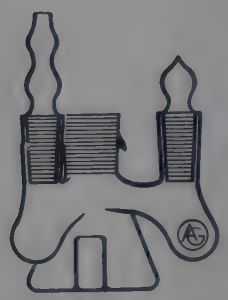
ME-842
FLASK, Warburg, Ⓐ, with side bulb and gas tube. Main neck 14/15 socket.
Set of 13 **£29·00** Each **£2·50** *ax*

ME-844
FLASK, Warburg, Ⓐ, as ME-842 but with additional side bulb which is stoppered.
Set of 13 **£ 42·00** Each **£3·60** *ax*

ME-430	**Pipettes, Warburg,** capacity 0·2, 0·5 and 1 cm^3	For prices see entries in List No. sequence.
JR-140	**Springs,** 38 mm	



ME-842



ME-844

Gallenkamp
REGD. TRADE MARK

WATER BATHS

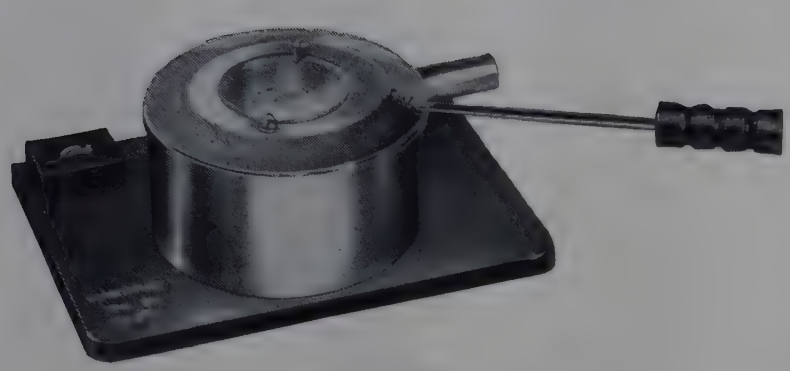
- Stainless steel interiors
- Thermostatically controlled
- Capacities from 10 to 70 litres
- Sample racks for serological testing

For details and prices see WF-360 to WF-470 in List No. sequence.

Gallenkamp MICRO-MELTING POINT APPARATUS

REGD TRADE MARK

Enables standard microscopes to be used to determine melting points up to 325°C on single crystals



MF-350

- **For bench and dissecting stage mounting and for clipping on elevated microscope stages**
- **Sample can be illuminated from above or by light from a substage mirror or illuminator**
- **Mains or battery operation**
- **Suitable for melting point of nylon to BS 2782 Part I Method 103 C**

OPERATION

The sample is placed on a cover glass within the central recess of the aluminium alloy melting point block. It is covered with a second cover glass and further shielded by a top plate having a central window of Chance HA1 heat absorbing glass. For samples liable to sublimation a suitable hole is provided for using a melting point capillary tube.

Sample temperature may be increased at a rate controlled by means of the variable autotransformer accessory or if a battery supply is used, by means of a suitable rheostat. Temperature is measured using a thermometer which is fitted through a tubulure mounted horizontally in the block.

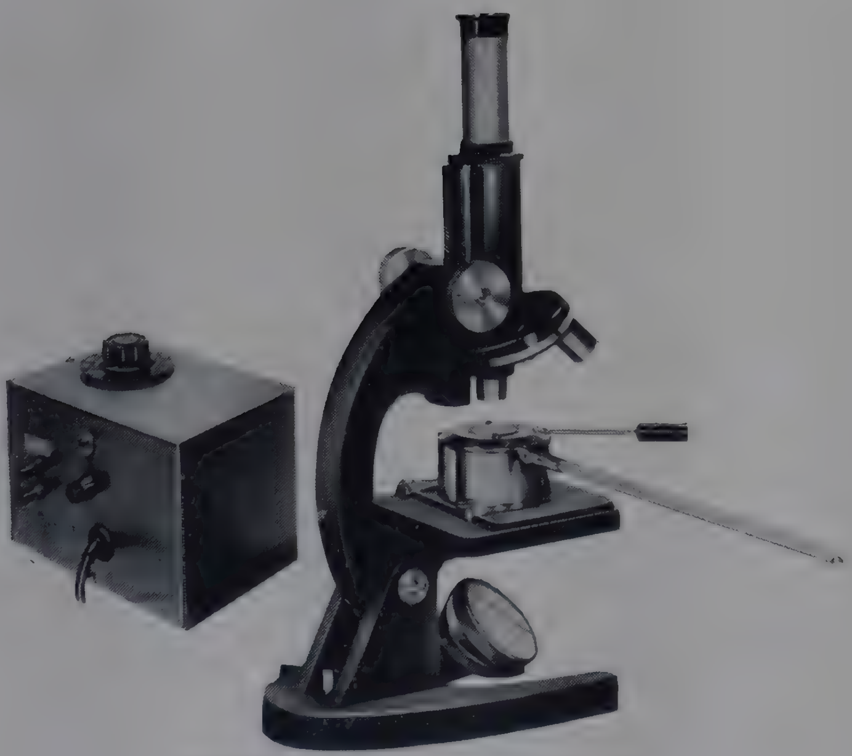
DIMENSIONS

	H W D
Overall	4·5 × 10 × 8 cm
Power rating, max.	60W

MF-350

MICRO-MELTING POINT APPARATUS, *Gallenkamp*, as specification. Requires but does not include cover glasses or thermometer. For 10V a.c. or d.c. supplies ... ... Each **£25·50** *bx*

Microscopes for use with the above must have a minimum objective lens to stage separation of 45 mm. For suitable microscope see ML-072 in List No. sequence.



MF-350 with MF-352, microscope and thermometer

ACCESSORIES

MF-352 **Variable autotransformer,** output 10V at 60W. For a.c. single phase supplies.
For 200/250V ... ... Each **£20·00** *mx*
For 100/120V ... ... Each **£20·00** *mx*

When ordering please state voltage and frequency of supply.

MF-386 **Capillary tubes,** for melting point determinations, 100 mm × 1·5–2·0 mm.
HJ-762 **Cover glasses,** thickness approximately 0·13 mm, dia. 13 mm and 19 mm.
TJ-340 **Thermometers** with immersion depth 30 mm and various scale spans ...

For prices see entries in List No. sequence.

Gallenkamp MELTING POINT APPARATUS

Registered Design No. 889339.

Electrically heated, for determinations of single or mixed melting points up to 350°C.

FEATURES

- **Adjustable rate of temperature rise**
- **Built-in boost heater**
- **Three melting point tubes simultaneously observed by means of full field lens**

ILLUMINATION AND VIEWING

The internal lamp, provides uniform and shadowless illumination of the sample tubes, which are viewed through a 2·5 cm dia. lens. The brightness of the background can be adjusted by rotating a knob to the rear of the apparatus.

HEATING

One heater is regulated by a built-in rotary rheostat which permits accurate adjustment of the rate of increase of temperature as the melting point is approached. The other heater, for boosting the heating rate is controlled by a switch. A second switch controls the lamp and the power input to the apparatus.

DESIGN

A cast aluminium case encloses the heating block and controls. The case, 23×13×30 cm high including thermometer support and melting point tube container, is finished in grey duotone stoved enamel. **For rapid cooling of the apparatus between tests, the water cooled plug is inserted in place of the thermometer.**

MF-370

MELTING POINT APPARATUS, *Gallenkamp*, electrically heated, as specification. **Without thermometer, cooling plug or capillary tubes.**

For 220/240V a.c. or d.c. supplies.	Each	**£31·00** *bx*
For 200/210V a.c. or d.c. supplies.	Each	**£31·50** *bxN*
For 110/120V a.c. or d.c. supplies.	Each	**£31·50** *bxN*

When ordering please state voltage and frequency of supply.

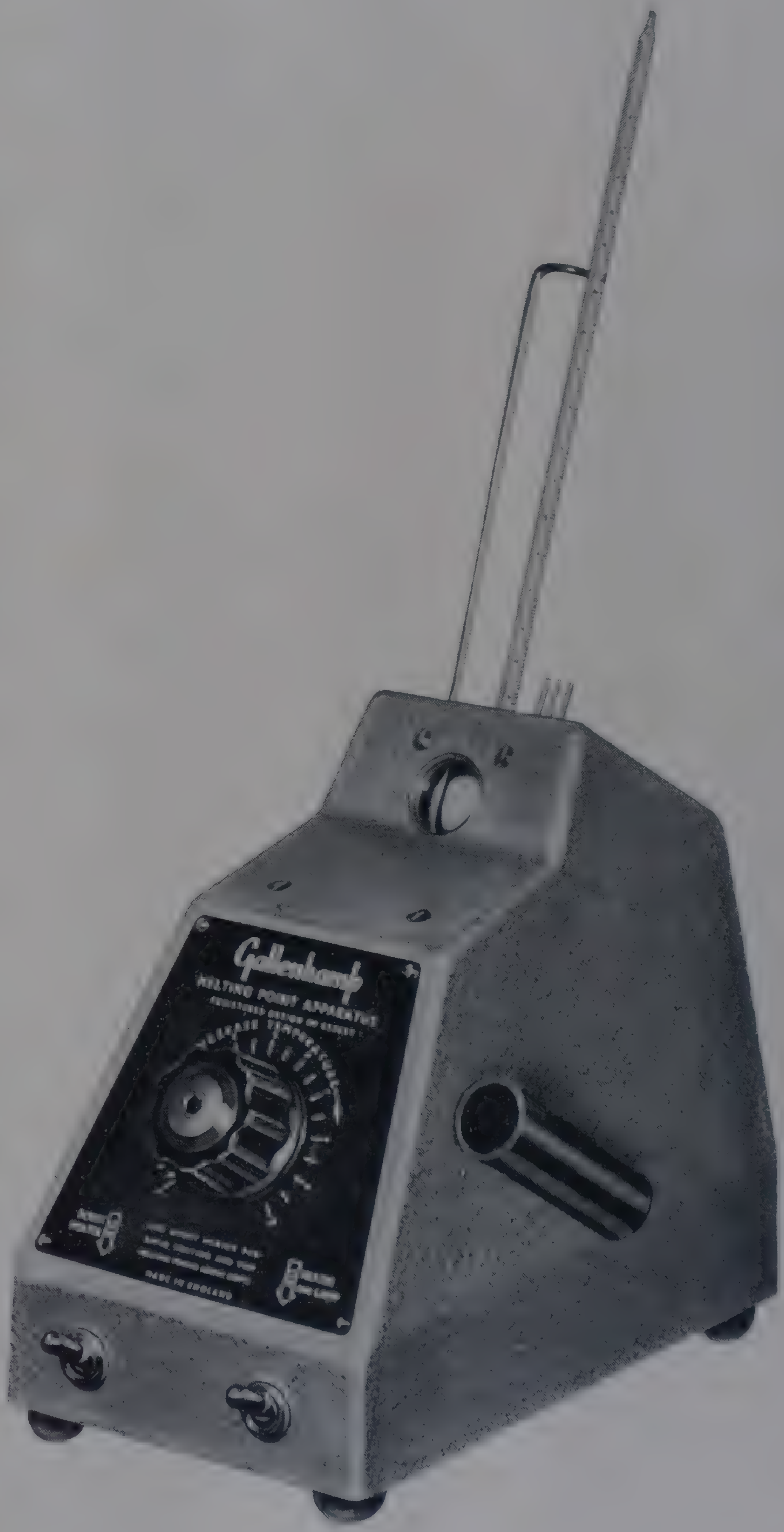
REPLACEMENT PARTS

MF-378	**Lamp,** 15W, SBC, pygmy, white.	Each	**£0·20** *mx*
MF-380	**Heaters** (two required).	Each	**£0·60** *mx*

When ordering replacement parts please state serial number of apparatus and supply voltage.

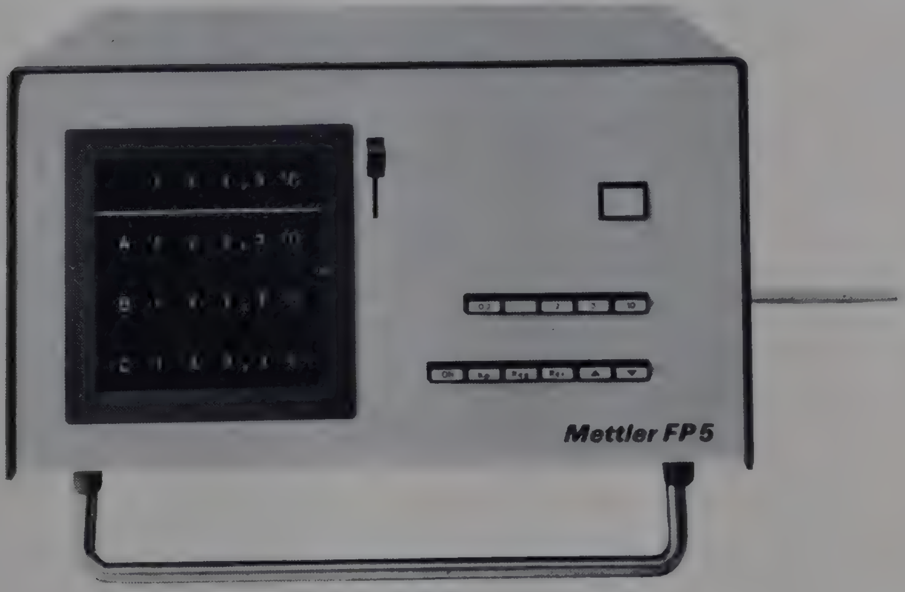
ACCESSORIES

MF-382	**Cooling plug,** for inserting in thermometer pocket	Each	**£2·30** *bx*
MF-386	**Capillary tubes,** for melting point determinations, 100 mm × 1·5–2·0 mm. Clean, dry and sealed at both ends. In pack of 100 tubes. 10 packs **£6·00**	Pack	**£0·66** *ax*
MF-388	**Capillary tubes,** for melting point determinations, 100 mm × 1·5–2·0 mm, open both ends. In pack of 100 tubes. 10 packs **£2·90**	Pack	**£0·35** *ax*
TJ-340	**Thermometers,** with immersion depth 30 mm and various scale spans. For details and prices see entry in List No. sequence.		



MF-370

METTLER AUTOMATIC MELTING, BOILING AND DROP POINT APPARATUS



MF-425

MODEL FP 5 CONTROLLER

For use with:

Melting and Boiling point oven	FP 51
Microscope Hot Stage	FP 52
Drop Point oven	FP 53

- **Push buttons for five heating and cooling rates**
- **Push button on/off switch**
- **Push button recording for 1, 2 or all 3 channels with normal indications for any channel not being recorded.**
- **Push button boiling point operation**
- **Push button temperature reversal control for microscope hot stage**
- **Push button for fast up and down heating or cooling**
- **Results displayed digitally to 0·1degC**

The controller contains digital temperature indicators and push button controls for temperature programmes. Rapid initial heating and final cooling controls are provided. The linearity of the programme selected is strictly maintained by solid state electronic systems. The top window shows actual temperature; the lower three store and indicate digitally three independent results each to an accuracy of 0·1degC.

When the 'Ready' light indicates that the pre-selected temperature has been reached the operator inserts the sample, selects the heating rate and presses the start lever.

When used with the FP 51 and FP 53 the results are automatically displayed and the oven is maintained isothermally at the last indicated temperature.

When used with the FP 51 and a recorder the temperature continues to rise until the maximum temperature is reached. The oven is maintained isothermally at this temperature.

When used with the FP 52 the temperature continues to rise until three results are displayed or the maximum temperature is reached. The oven is maintained isothermally at this temperature.

Technical Data

Temperature range	−20° to + 300°C
Heating and cooling rates degC/min	0·2, 1, 2, 3 and exploratory 10degC/min rate
Admissable voltage fluctuation	±10%
Recorder output	100mV into not less than 5 kΩ
Dimensions	36×38·5×21·5 cm high

***MF-425**

CONTROLLER, *Mettler* FP 5, as specification, with spare fuses and lamps. For 110, 125, 145, 160, 220 and 240V 50/60 Hz supplies ... ... Each **£579·00** *kx*

METTLER AUTOMATIC MELTING, BOILING AND DROP POINT APPARATUS

Mettler FP51

MF-435

MODEL FP51 AUTOMATIC MELTING AND BOILING POINT OVEN

For the rapid, accurate and reliable determination of melting and boiling points and for recording (by means of a suitable recorder) of melting range.

- **Temperature range −20 to +300°C**
- **Accurate temperature measurement by platinum resistance thermometer**
- **Simultaneous determination of melting point on three samples, with individual readout. Sample size 1 to 3 mg**
- **Up to 50 melting point determinations an hour**
- **Boiling points measured on single samples of 50 to 80 μl**
- **Up to 15 boiling point measurements an hour**
- **Reproducible results; manual control and observation minimised**
- **Rapid, automatic fan cooling**

Melting point determination

When the start lever has been depressed the instrument carries the determinations to completion with no further attention. The operator is required to do nothing more than read and record the individual results, each clearly displayed on the readout panel.

Performance and Technical Data

Heating rates, degC/minute	0·2; 1; 2; 3; 10
Accuracy of oven temperature (on 0·2degC/min rate and isothermal	Between 30 and 100°C: ±0·1degC on melting point and ±0·3degC on boiling point Between 100 and 200°C: ±0·2degC on melting point and ±0·6degC on boiling point Between 200 and 300°C: ±0·3degC on melting point and ±1degC on boiling point

For operation below ambient temperature, down to −20°C the oven unit must be operated in a refrigerated cabinet.

Dimensions: 16·2 cm dia. × 21·5 cm high.

*MF-435

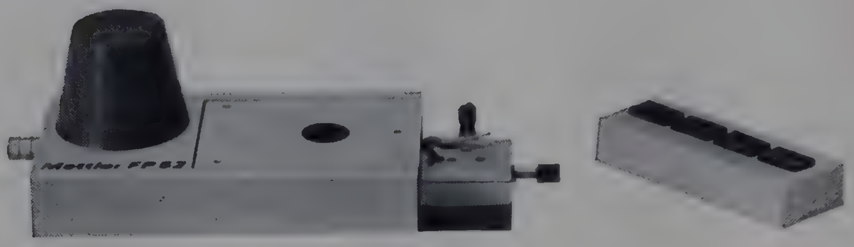
MELTING AND BOILING POINT OVEN, automatic, *Mettler* FP 51, as specification, including oven unit, melting and boiling point tubes, boiling capillaries, tube carrier, tube diameter gauge and standard benzoic acid. **Requires but does not include MF-425 Controller** ... ... Each **£180·00** *kx*

REPLACEMENT PARTS

***MF-440**	**Melting point tubes.**	In pack of 150...	Pack	**£1·20**	*ax*
***MF-446**	**Boiling point tubes.**	In pack of 40 ...	Pack	**£0·05**	*ax*
***MF-448**	**Boiling capillaries.**	In pack of 10 ...	Pack	**£1·40**	*ax*

METTLER AUTOMATIC MELTING, BOILING AND DROP POINT APPARATUS

continued



MF-455

MODEL FP52 AUTOMATIC MICRO-MELTING POINT HOT STAGE

Permits thermomicroscopic investigations to be carried out without the operator's attention being distracted by the need to control the rate of rise of temperature, to read a thermometer or to write down results whilst observing the sample.

- **Temperature range −20 to +300°C**
- **Accurate temperature control by platinum resistance thermometer**
- **Up to three independent values on one sample can be registered digitally**
- **Provides uniform temperature field pattern of the micro hot stage**
- **Heating stage can be connected to cold gas source for measurements below room temperature**

Typical applications

Determination of melting points using micro samples

Determination of eutectic temperatures

Investigation of polymorphous substances

Thermal analyses by contact method

Identification of synthetic fibre compounds

Investigation of liquid crystals

Hot Stage. This is constructed in two parts so that samples are heated simultaneously from above and below. It may be fitted to any standard microscope with a working distance of 29 mm. The heating plates incorporate a platinum resistance thermometer used for temperature measurement and a heat filter to protect the microscope objective. Built into the hot stage is a compact air blower which prevents the outer walls of the stage from becoming too hot and provides rapid cooling at the end of a test. A small nozzle is attached to the hot stage so that cold gases may be blown across the heating plates allowing determinations below ambient to be carried out at normal room temperature.

Push button module. Each time the operator observes a change and wishes to record the temperature at which it occurred, he has merely to press one of the three buttons, labelled A, B and C, and the accurate temperature is indicated on the controller, ready to be noted at the end of the test. A fourth button is provided which arrests the temperature programme and allows isothermal observations to be made at any time.

Performance and Technical Data

Accuracy of hot stage temperature (on 0·2degC/min rate and isothermal)	±0·1degC between 30 and 100°C ±0·2degC between 100 and 200°C ±0·3degC between 200 and 300°C

Design Data and Dimensions

Sample recess (prismatic)	45×30×2 mm
Sample carrier (trimmed)	76×19×1 mm
Hot stage dimensions	19·5×8·5×4·8 cm high
Field of vision	2·5 mm diameter
Sample/objective clearance	7·0 mm
Stage/objective clearance	29 mm

***MF-455**

MICRO-MELTING POINT HOT STAGE, automatic, *Mettler* FP 52, as specification, comprising hot stage and push button module. Includes two sets of 50 sample carriers and cover glasses, cooling vane, protective heat filter and replacement fan motor. **Requires but does not include MF-425 Controller** ... Each **£143·00** *kx*

REPLACEMENT PARTS

***MF-466** **Object stages,** 75×18×1 mm thick. In pack of 100. Pack **£1·68** *kx*

***MF-468** **Cover slips,** 15×15×0·2 mm thick. In pack of 100. Pack **£0·81** *kx*

ACCESSORY

***MF-470** **Phase sensing device.** Fits in eyepiece tube of microscope in place of eyepiece to detect transition from solid to liquid phase of sample. Requires recorder with 100 mV FSD and microscope fitted with polarising attachment ... ... Each **£38·00** *kx*

METTLER AUTOMATIC MELTING, BOILING AND DROP POINT APPARATUS

Mettler FP53

MF-475

MODEL FP53 AUTOMATIC DROP POINT OVEN

For the rapid determination of the drop point of greases, fats and waxes and extrusion points and softening points of tars and bitumens.

- **Temperature range −20 to +300°C**
- **Accurate temperature control by platinum resistance thermometer**
- **Drop points determined in accordance with methods described in ASTM D566—IP 132 DIN 51801 and BS 894 (Ubbelohde) using grease cup of standard dimensions**
- **Up to 12 determinations an hour**
- **Photoelectric detection ensures reproducible results**
- **Digital indication of drop point temperature**
- **Rapid automatic fan cooling**

Performance Data

Accuracy of oven temperature (on 0·2degC/min rate and isothermal)	±0·1degC between 30 and 100°C ±0·2degC between 100 and 200°C ±0·3degC between 200 and 300°C
Reproducibility with 99·9% stearic acid	±0·2degC

Technical Data and Dimensions

Sample quantity	0·4 to 0·6 g
Dimensions	16 cm dia. × 21·5 cm high

For operation below ambient temperature, down to −20°C the oven unit must be operated in a refrigerated cabinet.

*MF-475

DROP POINT OVEN, automatic, *Mettler* FP 53, as specification, comprising oven, 7 grease cups, 2 grease cup holders, spatula and rod. **Requires but does not include MF-425 Controller** ... ... Each **£193·00** *kx*

REPLACEMENT PARTS

***MF-487**	**Spares kit,** comprising 2 grease cup holders, 2 grease cups, spatula and rod	Kit	**£19·35**	*kx*
***MF-488**	**Grease cup,** set of 5	Set	**£2·31**	*kx*
***MF-489**	**Tar and bitumen cup,** set of 5 ...	Set	**£2·31**	*kx*

MF-550

MF-550

MELTING POINT APPARATUS, *Electrothermal,* for the determination of melting points up to 360°C. With block for up to 3 melting point tubes, which are illuminated by two lamps and viewed through a fixed focus lens. With rheostat to control rate of heating and boost heater button. Includes bottle of 'Aquadag' for coating the thermometer bulb, one pack of 100 capillary tubes and thermometer. Overall height without thermometer 41 cm, weight 6 kg. For 200/250V a.c. supplies.

Each **£82·95** *fx*

MF-555

MELTING POINT APPARATUS, *Electrothermal,* as MF-550 but **without rheostat or boost heater button** ... ... Each **£69·50** *fxN*

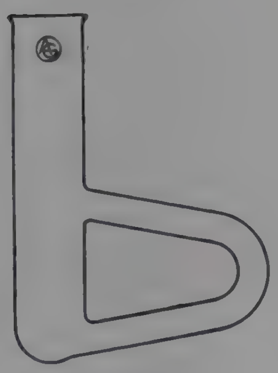
When ordering please state voltage and frequency of supply.

REPLACEMENT PART for MF-550 and MF-555

MF-562 **Thermometer,** scale span 20–360°C adjusted for 34 mm immersion ... ... Each **£5·60** *fx*

ACCESSORIES for MF-550 and MF-555

MF-386	**Capillary tubes**	For details and prices see entries in List No. sequence.
MF-388	**Capillary tubes**	



MF-570

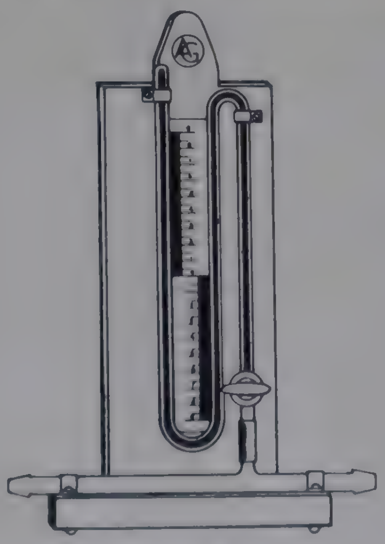
MF-570

THIELE TUBE, (AG), borosilicate glass. An inexpensive and accurate apparatus for heating melting point tubes at accurate rates for the determination of melting points. A capillary tube is wired to a suitable melting point thermometer so that the sample it contains is held close to the thermometer bulb. By means of a drilled cork the thermometer and capillary are mounted in the Thiele tube which is filled to just above the side limb with a non volatile fluid. On heating the bend of the side limb, heated liquid circulates and raises the temperature of the sample in such a way that stirring is unnecessary.

Ten **£6·00** Each **£0·66** *ax*

ACCESSORIES

MF-388	**Capillary tubes,** for melting point determinations, 100 mm × 1·5–2·0 mm, open both ends	For prices see entries in List No. sequence.
TJ-340	**Thermometers** with immersion depth 30 mm and various scale spans.	



Mercury filled Vacuum Manometer

MERCURY BAROMETERS	see BE-350 et seq.
MERCURY DISCHARGE LAMP	see LH-530
MERCURY MANOMETERS	see MB-020 et seq.
MERCURY REFERENCE CELL	see EF-490
MERCURY THERMOMETERS	see TJ-050 et seq.
MERCURY VACUUM GAUGES	see MB-050 et seq. and VB-960 et seq.

For details and prices see entries in List No. sequence.

Gallenkamp MERCURY STILL

REGD. TRADE MARK

Construction

The distillation vessel is a borosilicate glass bulb with wide-bore capillary feed and outlet tubes. A water cooled cold-finger condenser is sealed into the top of the bulb, which rests on an electric heater in an asbestolite insulating box. The whole assembly, including a mercury feed system and siphon outlet, is mounted on a wood stand with a large mercury tray base. A rheostat is used to adjust the heat input.

Automatic feed

Comprises a stainless steel reservoir suspended from a spring which maintains a constant mercury level in the distillation bulb. The still will process about 10 kg, without replenishment. The reservoir can be filled without interrupting the distillation process. A safety switch turns off the heater when the mercury level falls too low.

Operation

The apparatus is initially evacuated by means of a pump. When heat is applied, the mercury in the bulb boils *in vacuo*, condenses and flows down the outlet tube. Raw mercury from the reservoir flows into the feed tube. The distillate falling into the outlet tube produces a Sprengel pumping action which maintains a sufficient vacuum for the process provided the mercury is reasonably clean. Distilled mercury siphons out of the trap into a stock bottle. Output is approximately 2·5 kg/hr.

Dimensions 31 × 36 × 145 cm high.

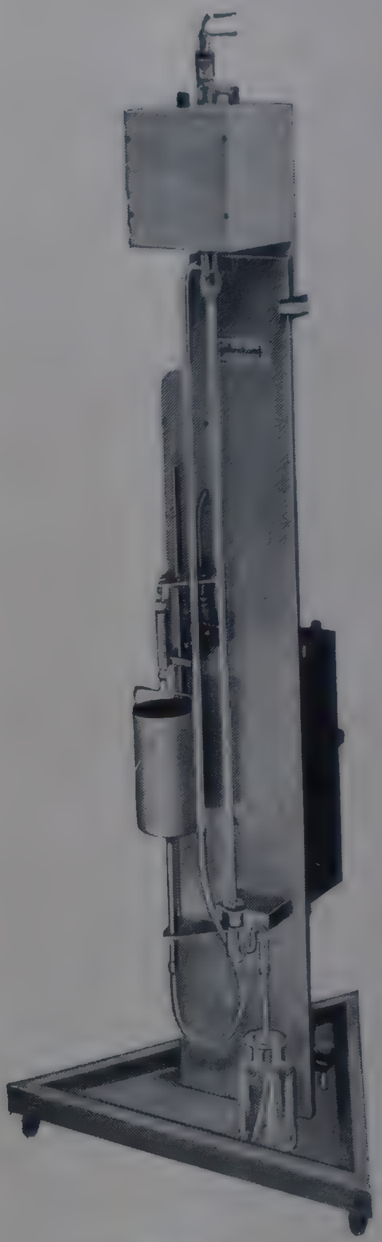
MF-855

MERCURY STILL, AUTOMATIC, *Gallenkamp*, as specification, electrically heated, with rheostat, automatic feed and instructions manual. For a.c. single phase supplies only.
For 200/250V ... ... Each **£123·00** *bx*
For 110/120V ... ... Each **£124·00** *bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS
MF-860 **Heating element** ... ... Each **£7·50** *bx*
When ordering please state voltage and frequency of supply.
MF-862 **Main glass part only,** borosilicate glass. Each **£6·60** *ax*

Vacuum pump for initial evacuation see VB-104 in List No. sequence.



MF-855

Gallenkamp

REGD. TRADE MARK

MERCURY CLEANING APPARATUS

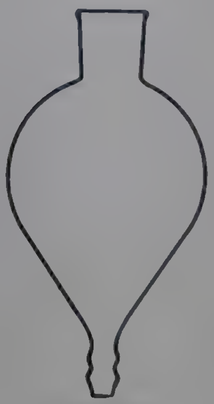
MF-880

MERCURY CLEANING APPARATUS, *Gallenkamp*, **Ostwald.** Mercury is cleaned by allowing it to fall in the form of small globules down a column of dilute nitric acid. The very small mercury drops are formed by passage through a sintered glass plate situated in the mercury reservoir at the top of the glass column. The apparatus is mounted on a hardwood stand with large mercury tray base ... ... Each **£16·25** *bx*

MF-885 **Main glass tube only,** for MF-880 ... Each **£2·20** *ax*
MF-890 **Reservoir,** glass, with sintered plate, porosity 0, 30 mm dia. ... ... Each **£1·50** *ax*

SINTERED FILTER TUBES for purification of mercury see FD-582 in List No. sequence.

MF-880



MF-920

MF-920

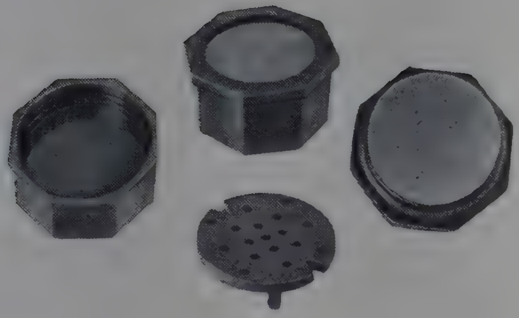
MERCURY RESERVOIRS, glass.

Capacity	150	250 ml	
Ten	**£5·70**	**7·00**	cx
Each	**£0·64**	**0·78**	

***MF-932**

MERCURY, triple distilled within A.R. Specification. In stoneware bottles.

Weight	500 g	1	3 kg	
Each	**£7·50**	**14·50**	**42·00**	cx



MF-935

MF-935

MERCURY COLLECTOR, for picking up spilt mercury, thus reducing this dangerous laboratory hazard. Comprises a plastics foam pad in a screw top polythene container. In use, the top with the pad attached is pressed firmly against the surface where mercury has been spilt. Mercury globules enter the cells in the pad and are expelled into the container when the lid is replaced. The lid contains a spare foam pad.

Each **£1·20** cx

MF-937 **Plastics foam pad,** spare for MF-935. Pack of 6 **£0·30** cx

Mercury tray see **TRAYS.**

METALLURGICAL APPARATUS

Apparatus for metallurgical purposes will be found in this catalogue as list below.

BR-620 to BR-730	**Specimen boats.**
CS-200	**Photoelectric colorimeter.**
CW-210 to CW-400	**Crucibles.**
EJ-085	**Electrodeposition analysers.**
FR-510 to FT-110	**Furnaces.**
GC-020 to GC-414	**Gas analysers.**
MU-060 to MU-282	**Grinding mills.**
MU-920	**Powder mixer.**
OV-010 to OV-445	**Ovens.**
OV-700	**Humidity oven.**
PC-550 to PC-650	**Particle sizing apparatus.**
PS-810 to PS-822	**Polishing machines and materials.**
PU-130 to PU-155	**Mounting presses and media.**
SA-300 to SA-330	**Salt spray cabinets.**
SA-590 to SA-600	**Sample dividers.**
SE-100 to SE-150	**Sieves.**
TP-530 to TP-535	**Thickness gauges.**
TT-140	**Engraving tool.**

For details see entries in List No. sequence.

METEOROLOGICAL APPARATUS

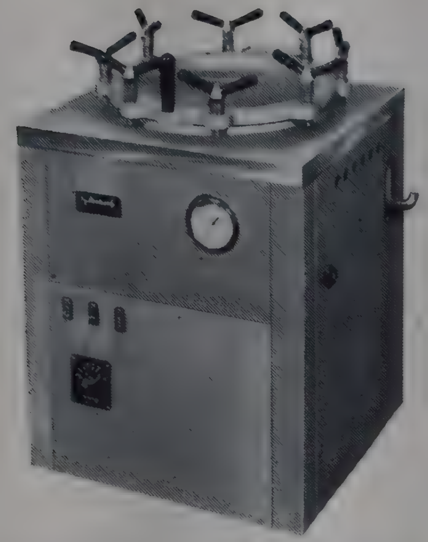
Apparatus for meteorological purposes will be found in this catalogue as list below.

BE-350 to BE-430	**Barometers,** mercury.
BE-450	**Barometer,** aneroid.
BE-521	**Barothermograph**
HV-010 to HV-060	**Hygrometers,** dew point.
HV-100 to HV-125	**Hygrometers,** Mason.
HV-200 and HV-201	**Hygrometers,** whirling.
HV-240	**Hygrometer,** Assman.
HV-252 and HV-254	**Humidity tables.**
HV-400 to HV-450	**Hygrometers,** paper and hair.
HV-570 and HV-572	**Humidity calculators.**
RB-820	**Rain gauge.**
SH-080 to SH-090	**Soil moisture tensiometers.**
SH-210	**Thermometers,** soil.
TJ-920 to TJ-934	**Thermometers,** maximum and minimum.
TJ-952 to TJ-966	**Thermometers,** wall.
TK-130 to TK-135	**Thermographs.**
TK-150 to TK-200	**Thermohygrographs.**

For details see entries in List No. sequence.

MICROBIOLOGY

A selection of *Gallenkamp* apparatus for use in Microbiology
For full details and prices of the items see entries in List No. sequence

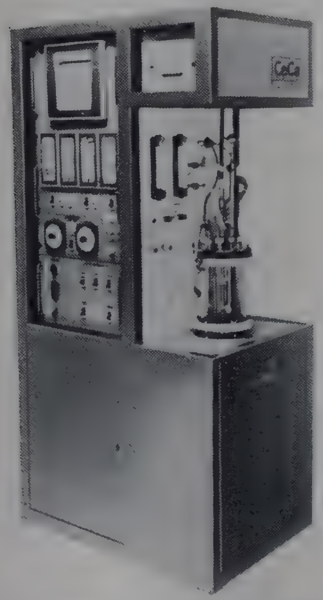


Autoclaves—see AX-100 et seq.

Incubators—see IH-100 et seq.

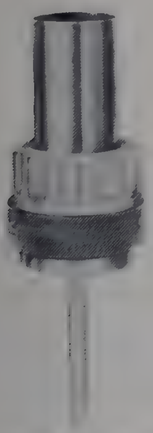
Ovens—see OV-010 et seq.

Cooled Incubators—see IH-275 et seq.

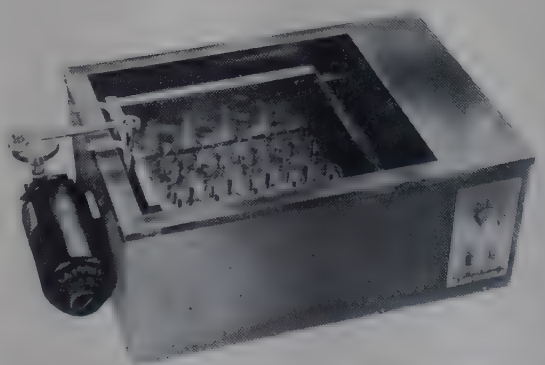


Continuous Culture Apparatus
—see CX-650

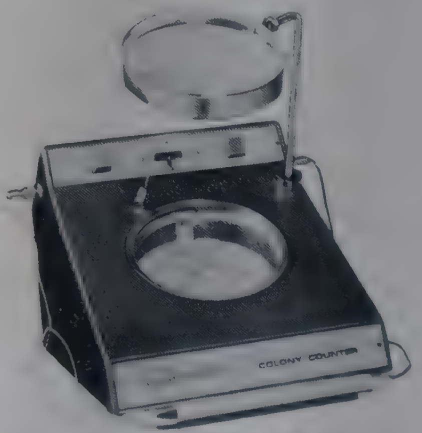
Orbital Incubators—see IH-460 et seq



Membrane Filter Holders
—see FD-300 et seq.



Shaking Incubators—see IH-350 et seq.



Colony Counter—see CX-300

Other useful items for Microbiology will be found under the following page headings

Balances
Bottles
Centrifuges
Crucibles, filtering
Culture
Dissecting
Electrochemical Analysis
Filter Pumps
Filters, sintered glass
Flasks
Freeze Drying
Histology
Medical
Microscopes
Mixers
Pipettes
Tubes
Water and Chemical Pumps

MICROCHEMICAL APPARATUS

Apparatus suitable for microchemical purposes as indicated below will be found in List No. sequence.

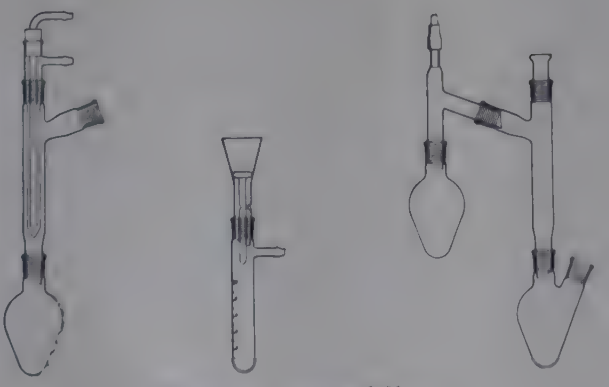
AB-920	**Absorption tube,** Flaschenträger.
BA-500 to BA-541	**Balances,** micro and semi-micro, *Mettler.*
BJ-655	**Beakers.**
BR-730	**Boats,** micro-combustion.
BW-634 to BW-786	**Burettes,** micro.
BX-085, BX-095, BX-285 and BX-485	**Burners,** micro.
CF-200	**Centrifuge,** semi-micro.
CJ-005 to CJ-015	**Centrifuge tubes,** micro.
CK-180 to CL-910	**Chromatography** apparatus.
CS-200 to CS-283	**Colorimeter.**
DK-710	**Desiccator,** pistol pattern.
DK-725	**Drying apparatus.**
DT-578	**Distillation/Sublimation** apparatus.
DT-760 and DT-765	**Distillation sets,** semi-micro.
DT-870	**Laboratory set,** semi-micro.
FD-594 to FD-654	**Sintered filters,** Pregl and others.
FH-500	**Flame analyser.**
FJ-170 to FJ-196	**Flasks,** semi-micro.
FP-485	**Funnels.**
GE-040	**Gas generator,** semi-micro.
HD-575	**Heating mantle.**
HR-100	**Micro hydrogenation** apparatus.
MD-010	**Micro haematocrit** centrifuge.
MD-120 to MD-150	**Microdiffusion** dishes and shaker.
MF-350	**Micro-melting point** apparatus.
MW-140 and MW-145	**Ebulliometer,** semi-micro, Heitler.
NR-410 to NR-691	**Nitrogen determination,** Kjeldahl.
NT-030	**Nitrometer,** micro.
PM-486 and PM-566	**Pipettes,** micro.
PR-355 and PR-365	**Plates** for spot analysis.
SJ-210 and SJ-212	**Spatulas,** Chattaway micro.
WT-018 and WT-175	**Weighing accessories.**

AG

Regd. Trade Mark

SMALL SCALE PREPARATIVE SETS

For educational and industrial organic chemistry



Typical assemblies

- Semi-micro scale: 1 to 10 g product quantities
- Components have 14/15 interchangeable ground joints
- Suitable for a wide range of preparations

For full details and prices see DT-760 and DT-765 in List No. sequence.

MICROSCOPES

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MICROSCOPE OPTICS

The primary factors governing the performance of an objective are its magnification and its numerical aperture. Other factors, such as focal length and working distance are determined by these two primary factors.

MAGNIFICATION

All objectives listed in this catalogue, except those used with the inverted microscopes, are based on a mechanical tube length of 160 mm. By increasing the mechanical tube length, the initial magnification is increased according to

$$\text{Initial magnification} = \frac{\text{Tube length mm}}{\text{Focal length mm}}$$

Inclined monocular and binocular bodies are fitted with a correcting lens to compensate for the increase in mechanical tube length.

NUMERICAL APERTURE (N.A.)

The N.A. gives a measure of the resolving power of an objective. The greater the N.A. the greater the resolution. The **maximum useful** magnification obtainable from an objective is approximately 1000 times the N.A. Thus it can easily be calculated whether a particular combination of objective and eyepiece has reached or over-reached the effective power of the objective.

FIELD NUMBER

This is the product of the magnifying power of the objective and the diameter of the field of view.

DEPTH OF FOCUS

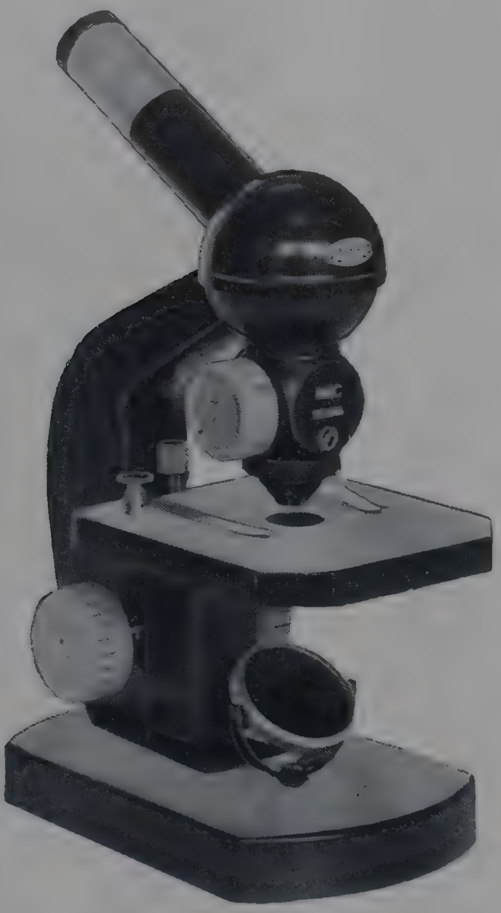
The greater the N.A. of an objective, the smaller is the depth of field in which the object remains in focus. By reducing the N.A. and by stopping down the iris diaphragm, greater depth of focus is achieved at a cost of reduced resolution.

OLYMPUS MICROSCOPES

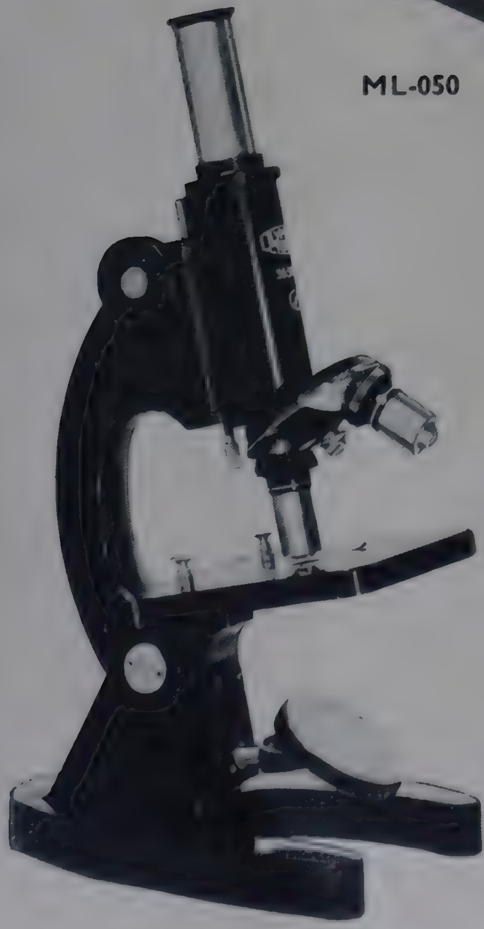
As exclusive Distributors in the United Kingdom only for biological microscopes made in Japan by Olympus Optical Co. Ltd. we are unable to offer for sale outside the U.K.

All lenses fitted to *Olympus* microscopes are hard coated for maximum contrast and resolution.

All *Olympus* microscopes have an adjustment on the coarse focus which enables the user to vary the torque needed to rotate the knobs. It is only necessary to rotate one knob in the opposite direction from the other to tighten or loosen the movement.



ML-050



ML-070

Olympus
MODEL MIC MICROSCOPE

A compact, inexpensive microscope for schools use. Supplied with plastics carrying case.

- **Inclined monocular head**
- **Fixed square stage with clips**
- **Built-in magnification control**
- **Stage focusing by rack and pinion**
- **Adjustable focus stop protects slide and objective**
- **Magnifications ×40 ×75 ×150 and ×300**

***ML-050**

MICROSCOPE, *Olympus* **Model MIC,** as specification.
Each **£21·50** *px*

NOTE: No accessory optical elements can be fitted to this microscope.

ACCESSORIES

ML-114	**Substage illuminator, Model LSK-111,** plug-in type	For details and prices see entries in List No. sequence.
ML-801	**Replacement lamp**	

Olympus
MODEL ST MICROSCOPE

A robust microscope especially recommended for simple routine work and for schools use. Supplied in carrying case.

- **Fixed square stage with clips**
- **Rack and pinion focus mechanism**
- **Rotating click-stop 5-aperture diaphragm**
- **Double nosepiece with click-stops**
- **Preset focusing stop avoids damage to slide or objective**
- **Magnifications from ×70 to ×600**
- **Optical elements—eyepieces H×7, P×15**
  objectives N×10, N×40

***ML-070**

MICROSCOPE, *Olympus* **Model ST,** as specification, including the four optical elements shown above.
Each **£38·00** *px*

For Lens Codes see pages 446/447.

ACCESSORY

ML-800 **Substage illuminator, Model LSK-11.** For details and price see entry in List No. sequence.

Olympus
MODEL STN MICROSCOPE

This microscope is a Model ST but with optical elements selected and **approved by the Nuffield Biology Project** for the O-level biology course. Supplied in carrying case.

- **Fixed square stage with clips**
- **Rack and pinion focus mechanism**
- **Rotating click-stop 5-aperture diaphragm**
- **Double nosepiece with click-stops**
- **Preset focusing stop avoids damage to slide or objective**
- **Magnifications ×40 and ×100**
- **Optical elements—eyepiece H×10**
  objectives N×4, N×10

***ML-072**

MICROSCOPE, *Olympus* **Model STN,** as specification, including the three optical elements shown above.
Each **£25·50** *px*

For Lens Codes see pages 446/447.

ACCESSORIES

ML-500	**Objective, N×20 ... ...**	For details and prices see entries in List No. sequence.
ML-800	**Substage illuminator, Model LSK-11 ... ...**	

ML-072

Olympus
MODEL HSB MICROSCOPE

A versatile microscope suitable for use in schools and industrial laboratories.

- **Monocular body which can be inclined through 90°**
- **Triple nosepiece**
- **Coarse and fine focusing**
- **Fixed square stage with clips, drilled to accept accessory mechanical stage**
- **Simple fixed condenser**
- **Rotating click-stop 5-aperture diaphragm**
- **Preset focusing stop**
- **Magnification from ×40 to approx. ×400**
- **Optical elements—eyepiece H×10—objectives N×4, N×10, N×40**

***ML-074**

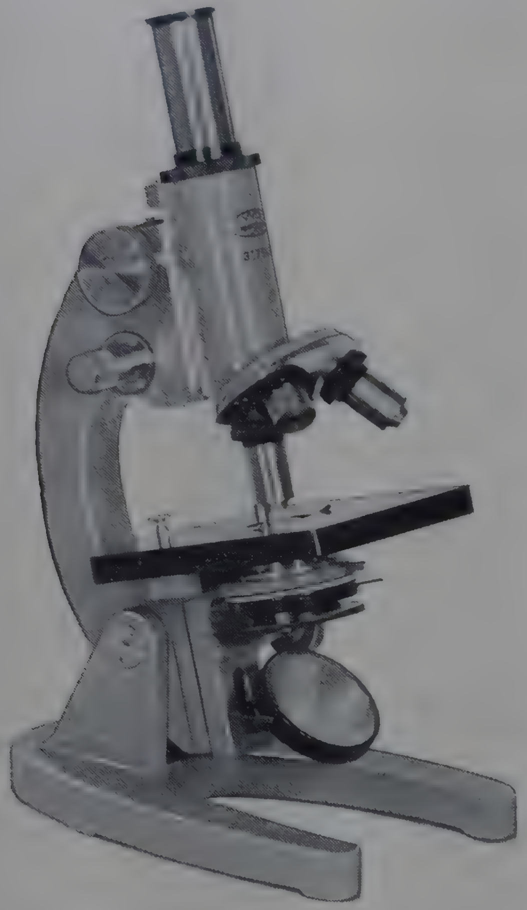
MICROSCOPE, *Olympus* **Model HSB,** as specification, including the four optical elements shown above and carrying case ... ... Each **£48·50** *px*

For Lens Codes see pages 446/447.

ACCESSORIES

ML-112	**Graduated mechanical stage Model FM-2 ... ...**	For details and prices see entries in List No. sequence.
ML-800	**Substage illuminator, Model LSK-11 ... ...**	

ML-074



ML-075

Olympus
MODEL HSC MICROSCOPE

A versatile microscope recommended for advanced students use.

- **Monocular body which can be inclined through 90°**
- **Triple nosepiece**
- **Coarse and fine focusing**
- **Fixed square stage, drilled to accept accessory mechanical stage**
- **Abbé condenser N.A. 1·25 with iris diaphragm**
- **Condenser focusing by rack and pinion**
- **Preset focusing and condenser stops**
- **Magnification from ×40 to approx. ×400**
- **Optical elements—eyepiece H×10—objectives N×4, N×10, N×40**

***ML-075**

MICROSCOPE, *Olympus* **Model HSC,** as specification, including the four optical elements shown above and carrying case ... ... Each **£55·50** *px*

For Lens Codes see pages 446/447.

ACCESSORIES

ML-112	**Graduated mechanical stage Model FM-2**	For details and prices see entries in List No. sequence.
ML-800	**Substage illuminator, Model LSK-11**	

ML-080

Olympus
MODEL GB MICROSCOPE

A general purpose, high performance microscope for industrial and advanced teaching laboratories. Can be used for photomicrography.

- **Graduated draw tube**
- **Monocular head**
- **Quadruple nosepiece**
- **Coarse and fine focusing adjustment knobs**
- **Fixed square stage with built-in mechanical stage**
- **Condenser N.A. 1·25 with iris diaphragm**
- **Condenser focusing by rack and pinion**
- **Magnifications from ×50 to approx. ×1500**
- **Optical elements—eyepieces H×5, P×10, P×15 objectives N×10, N×40, S×100**

***ML-080**

MICROSCOPE, *Olympus* **Model GB,** as specification, including the six optical elements shown above and carrying case ... ... Each **£115·00** *px*

For Lens Codes see pages 446/447.

ACCESSORIES

ML-800	**Substage illuminator, Model LSK-11**	For details and prices see entries in List No. sequence.
HJ-520	**Immersion oil**	

Olympus
SERIES K MICROSCOPES

A range of modern microscopes for school and college advanced biological laboratories with features normally restricted to expensive research models. Supplied in fitted hardwood case with lock and key.

STAND
The stand and base are of rigid construction.

HEAD
The monocular head is inclined at 45° and is rotatable through 360°.

EYEPIECES
All eyepieces are hard coated for high transmission and quality definition.

The standard equipment includes a WF×10 wide field eyepiece. Alternative eyepieces are available and are listed on pages 447/448.

NOSEPIECE
The quadruple click-stop nosepiece gives smooth accurate alignment.

OBJECTIVES
All achromatic objectives are parfocal and interchangeable and supplied in dust-proof plastics tubes. Alternative objectives are available and listed on page 496.

STAGE
A large size stage (110×140 mm) is predrilled and tapped to accommodate a mechanical stage which is available as an accessory.

SUBSTAGE
Abbé condenser N.A. 1·25 focusing by rack and pinion through a variable iris diaphragm with swing-out filter holder.

ILLUMINATION
A plano-concave mirror is included in the standard equipment.

A 20W illuminator ML-114 or Universal illuminator ML-802 with transformer are available as alternatives.

FOCUSING
Vertical movement of the stage, by conveniently located coaxial coarse and fine adjustment controls.

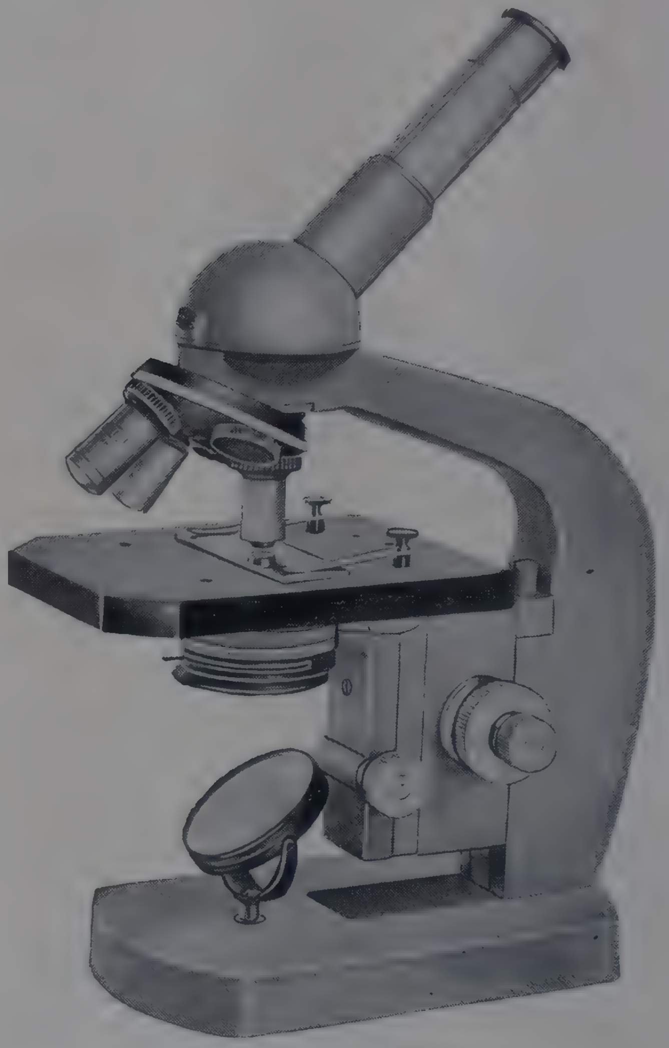
Coarse focus range 28 mm.

Fine focus range 2 mm.

For Lens Codes see pages 446/447.

NOTE: ML-100 is approved by the Nuffield Biology Project for the O-level biology course.

- **Coaxial coarse and fine focusing knobs**
- **Substage focusing by rack and pinion**
- **Inclined rotatable monocular head**
- **Quadruple nosepiece**
- **Large size stage to accommodate attachable mechanical stage**
- **Preset focusing lock protects slides and objectives**



ML-100
(ML-102 and ML-104 are similar)

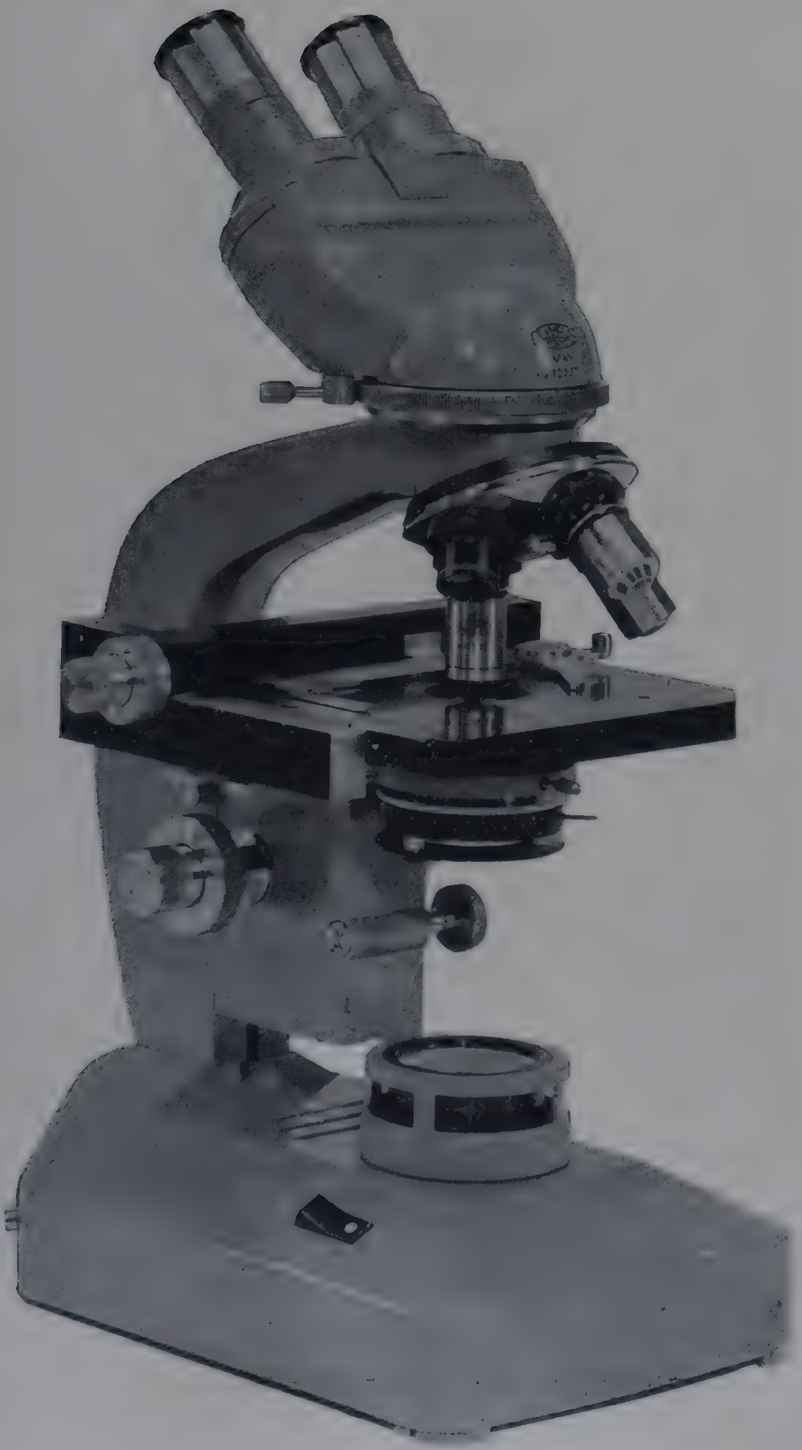
List No.	Model	Wide field eyepiece	Achromatic objectives	Abbé condenser	Magnification range	Each	
						£	
***ML-100**	KI	WF×10	N×4, N×10, N×40	N.A. 1·25	×40 to ×400	**76·50**	px
***ML-102**	KII	WF×10	N×10, N×40, S×100	N.A. 1·25	×100 to ×1000	**90·50**	px
***ML-104**	KIII	WF×10	N×4, N×10, N×40, S×100	N.A. 1·25	×40 to ×1000	**94·00**	px

ACCESSORIES

*ML-112	**Graduated mechanical stage, Model FM-2,** range of movement 50×25 mm. Vernier scales reading to 0·1 mm ... ... Each	**£17·75**	px
*ML-114	**Substage illuminator, Model LSK-111,** plug-in type, with 20W lamp and two replacements. Requires no transformer. For 240V a.c. or d.c. supplies. Each	**£6·50**	px

ML-801	**Replacement lamp,** 20W, for illuminator ML-114	For details and prices see entries in List No. sequence.
ML-802	**Universal light source, Model LSD,** with transformer.	
ML-730	**Dark field condenser, Model DC**	
ML-860	**Phase contrast outfit** ...	
HJ-520	**Immersion oil**	

- **Inclined binocular head rotatable through 360°**
- **High quality optics**
- **Magnifications from ×40 to ×1000 with optics supplied**
- **Enclosed rack and pinion**
- **Coaxial coarse and fine focusing adjustment knobs**
- **Large built-in mechanical stage**
- **Preset focusing lock protects slides and objectives**
- **Built-in illuminator**



ML-140

Olympus
MODEL KHC MICROSCOPE

A low priced research microscope of modern design suitable for routine medical and biological studies and research.

HEAD

Inclined binocular head, rotatable through 360° with interocular distance adjustable from 56 mm to 74 mm and individual acuity adjustment to facilitate sharpest possible image.

EYEPIECES

All eyepieces are hard coated for high transmission and quality definition.

NOSEPIECE

The quadruple click-stop nosepiece gives accurate alignment.

OBJECTIVES

All achromatic objectives are parfocal and interchangeable and supplied in dustproof plastics tubes.

STAGE

Horizontal mechanical stage (120×140 mm) with fine vernier graduation. Designed with convenient coaxial controls for slide manipulation through 30×70 mm.

SUBSTAGE

Abbé condenser N.A. 1·25 focusing by rack and pinion with variable iris diaphragm and swing-out filter holder and removable blue filter.

ILLUMINATION

The base of the microscope ML-140 incorporates a pre-centred 20W lamp. Microscope ML-142 has a 30W lamp and transformer to provide variable intensity illumination.

FOCUSING

Vertical movement of the stage is by coarse and fine focusing controls.

Coarse focus range 28 mm Fine focus range 2 mm

***ML-140**

MICROSCOPE, *Olympus* **Model KHC,** as Specification with BiWF×10 paired eyepieces, N×4, N×10, N×40 and S×100 achromatic objectives, N.A. 1·25 Abbé condenser and 20W pre-centred illuminator including two replacement lamp bulbs. Supplied in fitted hardwood case with lock and key ... ... Each **£176·00** *px*

***ML-142**

MICROSCOPE, *Olympus*, **Model KHC,** as ML-140 but with 30W low voltage, variable intensity illuminator and separate transformer ... ... Each **£197·00** *px*
For Lens Codes see pages 446/447.

REPLACEMENT PARTS

***ML-148** **Lamp bulb,** 20W, for ML-140 illuminator. Each **£1·35** *px*

***ML-149** **Lamp bulb,** 30W, for ML-142 illuminator. Each **£1·10** *px*

ACCESSORIES

The optical range can be extended by using additional eyepieces, objectives and condensers listed on pages 446 to 448.

***ML-150** **Vertical monocular head** for micrographic work. Screws on in place of binocular head ... Each **£5·75** *px*

***ML-152** **Plano-concave mirror** for use with external illuminator when the built-in illumination is insufficient. Screws on in place of illuminator condenser lens ... Each **£4·50** *px*

HJ-520 **Immersion oil.** For details and price see entry in List No. sequence.

Olympus
MODELS EHT and FHT MICROSCOPES

High performance research microscopes with built-in illumination and sensitive stage focusing.

STANDS

Rigid stands with built-in illuminators and provision for interchangeable heads and stages. Focusing range: coarse 32·5 mm; fine 1·2 mm. An adjustable focus stop is incorporated in the coarse focusing mechanism to protect objectives and specimens and to facilitate the use of oil immersion objectives.

EHT models have two separate knobs for stage focusing, sensitive to 0·002 mm.

FHT models have two coaxial knobs for stage focusing, sensitive to 0·0005 mm.

HEADS

Inclined binocular and trinocular heads are supplied as standard. Vertical monocular, inclined monocular and special heads for super wide field or double observation are available.

EYEPIECES

Wide range of Huygenian, wide field, high eyepoint wide field, compensating and photographic eyepieces is available. Range also includes graticule and pointer eyepieces. All eyepieces are hard coated for high transmission and quality definition.

NOSEPIECE

The quintuple click-stop nosepiece is mounted on ball bearings for smooth and accurate operation. Objective positioning symbols are engraved on the nosepiece.

OBJECTIVES

High quality achromatic, fluorite and planachromatic lenses are supplied with standard outfits. Additionally, apochromatic and plan-apochromatic and phase contrast objectives are available.

STAGES

EHT models have a large mechanical stage, 140 × 145 mm, capable of partial rotation and with vertically disposed, low level, coaxial controls providing 52 × 76 mm stage movement.

FHT models have a large mechanical stage, 135 × 160 mm, capable of 360° rotation and having horizontally disposed coaxial controls on both sides providing for 44 × 76 mm movement.

On both stages vernier graduations are provided reading to 0·1 mm.

SUBSTAGE

Centring substage with rack and pinion focusing movement.

CONDENSERS

Models are fitted either with Abbé condensers, N.A. 1·25 or achromatic/aplanatic condensers, N.A. 1·40.

Condensers for dark field, extra low magnification, super wide field and for phase contrast applications are available.

- **Choice of binocular or trinocular head**
- **Large built-in mechanical stage**
- **Preset focus lock protects slides and objectives**
- **Wide range of optical elements**

ML-202

ILLUMINATION

A highly corrected Köhler system is incorporated in each instrument. The 30 watt grid filament lamp is fed from an integral transformer and an electronic voltage controller with voltage indicator.

When ordering please state voltage and nature of supply.

REPLACEMENT PART

ML-803 **Lamp bulb,** 30W. For price see entry in List No. sequence.

ACCESSORIES

HJ-520 **Immersion oil.** For price see entry in List No. sequence.

Eyepieces Objectives Condensers	Phase contrast outfit Photomicrographic equipment	See pages 446 to 451

RECOMMENDED ASSEMBLIES **For Lens Codes see pages 446/447**

List No.	Model	Ocular eyepieces (paired)	Photoeyepieces	Objectives	Condenser	Head	Each	
							£	
***ML-170** ***ML-172**	EHT 421 FHT 521	BiP × 7 BiWF × 10 BiP × 15		N × 4 N × 10 N × 40 S × 100	Abbé N.A. 1·25	Binocular	321·00 398·00	px px
***ML-200** ***ML-202**	EHT 431 FHT 531	BiP × 7 BiWF × 10 BiP × 15	FK × 2·5 FK × 3·3 FK × 5 FK × 6·7	N × 4 N × 10 N × 40 S × 100	Abbé N.A. 1·25	Trinocular	362·00 441·00	px px
***ML-218** ***ML-220**	EHT 432 FHT 532	BiP × 7 BiHEPWF × 10 BiP × 15 BiK × 20	FK × 2·5 FK × 3·3 FK × 5 FK × 6·7	N × 4 N × 10 Fl × 40 Fl × 100	Achromatic/ Aplanatic N.A. 1·40	Trinocular	462·00 543·00	px px
***ML-224** ***ML-226**	EHT 433 FHT 533	BiP × 7 BiHEPWF × 10 BiP × 15 BiK × 20	FK × 2·5 FK × 3·3 FK × 5 FK × 6·7	Pl × 4 Pl × 10 Pl × 40 Pl × 100	Achromatic/ Aplanatic N.A. 1·40	Trinocular	528·00 613·00	px px

- Modular design—wide range of interchangeable accessories
- Controls placed for maximum comfort to operator
- Wide range of photomicrographic assemblies possible
- High quality planachromatic objectives
- Köhler illumination at all magnifications

C-35A
OLYMPUS
OLYMPUS

ML-260 with photomicrographic camera attachment ML-910

Olympus
VANOX UNIVERSAL RESEARCH MICROSCOPE

A modular microscope system based on modern design and manufacturing techniques. A wide range of interchangeable accessories is available to enable the microscope to be modified or elaborated quickly and easily as required.

STAND

The basic stand is supplied with a quintuple, interchangeable nosepiece, a binocular head, a three-position system for combined direct viewing and photographic work, coarse and fine coaxial focusing controls and a tungsten illuminator.

STAGES

A mechanical stage with low-level controls is supplied as standard. This stage measures 170×172 mm and has vertical and horizontal movements of 52 mm and 76 mm with vernier scale adjustment reading to 0·1 mm. The specimen holder can be removed to give a plain stage.
Other stages available include a mechanical stage with horizontal controls, fully rotatable and a circular rotatable polarising stage.

OBJECTIVES

High quality planachromatic objectives are supplied with the standard outfit but a large range of fluorite, apochromatic and planapochromatic objectives is also available.

EYEPIECES

High eye-point wide field ×10 eyepieces are supplied with the standard outfit. For photomicrographic work there are specially corrected photographic eyepieces and field of view eyepieces for various formats.

TRANSMITTED LIGHT SYSTEM

Köhler illumination is provided for the entire range of objectives from ×1·3 to ×100 by a system incorporating a reversing auxiliary lens assembly and an achromatic/aplanatic condenser. The light source is a 30W 6V tungsten lamp in a well ventilated centring housing. Objectives are fully illuminated without unevenness regardless of numerical aperture.

***ML-260**
MICROSCOPE, *Olympus* **VANOX,** as specification.
Outfit comprising:
Main stand with binocular head, combination binocular and photo head, quintuple nosepiece and mechanical stage with insert plate.
Achromatic/aplanatic condenser with centring device.
Planachromatic objectives ×4, ×10, ×20, ×40 and ×100.
Paired eyepieces ×10 high eyepoint wide field.
Auxiliary lens system with iris diaphragm.
Colour filters, green, yellow, cobalt and magenta.
Tungsten light source with built-in controls, collector heat filters and spare lamp.
Cargille oil.
Plastics dust cover, instructions manual and certificate of inspection.
Each **£971·00** *px*

ACCESSORIES

***ML-262**	**Condenser,** N.A. 0·32, for low magnification.	Each **£17·50** *px*
***ML-263**	**Condenser,** dark field, N.A. 1·2/1·4 ...	Each **£46·75** *px*
***ML-264**	**Condenser,** dark field, dry, N.A. 0·8/0·92.	Each **£46·75** *px*
ML-560	**Objectives,** apochromatic, ×40, dry and oil immersion. For prices see entry in List No. sequence.	

Attachments for fluorescent, halogen, xenon, incident bright field and electronic flash illumination and phase contrast applications are available. Details on request.

For photomicrographic applications the Vanox outfit can be used with the PM-10 illumination systems to provide complete assemblies with varying degrees of automation.

Details of the PM-10 systems will be found on page 451 and quotations for suitable outfits will be sent on request.

Olympus
MODEL CK INVERTED MICROSCOPE

A simplified microscope for routine examination of cultures in bottles, dishes or tubes.

HEAD
Binocular or monocular, inclined at 45°.

EYEPIECES
Paired or single ×10.

NOSEPIECE
Triple nosepiece with click-stops for quick accurate centring of objectives.

OBJECTIVES
Achromatic, long working distance ×4 and ×10. Accessory ×20 objective available as optional extra.

STAGE
Large, plain stage 180×150 mm, with stage clips on pillars, height adjustable for holding Petri dishes, culture flasks, etc. Side extension plates each measuring 140×70 mm facilitate manipulation of specimens.

ILLUMINATION
Compact illuminator slides on vertical pillar which can be attached to front or rear of stage. Incorporates helical focusing, centring screws for lamp, slide-in filters and iris diaphragm. Lamp is 6V, 12W, fed by a transformer in base of microscope.

FOCUSING
Single focusing system operated by large diameter paired knobs, gives 15 mm movement. The stage remains stationary and permits the contents of large containers to be examined.

MAGNIFICATION
Standard outfit gives ×40 and ×100. Accessory ×20 objective available for magnification of ×200.

***ML-280**

MICROSCOPE, *Olympus* **Inverted Model CK,** as specification with inclined **monocular** head, triple nosepiece, plain stage, single ×10 eyepiece, ×4 and ×10 achromatic long working distance objectives and built-in illumination. For 220 and 240V a.c. supplies. Each **£162·00** *px*

***ML-282**

MICROSCOPE, *Olympus* **Inverted Model CK,** as specification with inclined **binocular** head, triple nosepiece, plain stage, paired ×10 eyepieces, ×4 and ×10 achromatic long working distance objectives and built-in illumination. For 220 and 240V a.c. supplies. Each **£214·00** *px*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

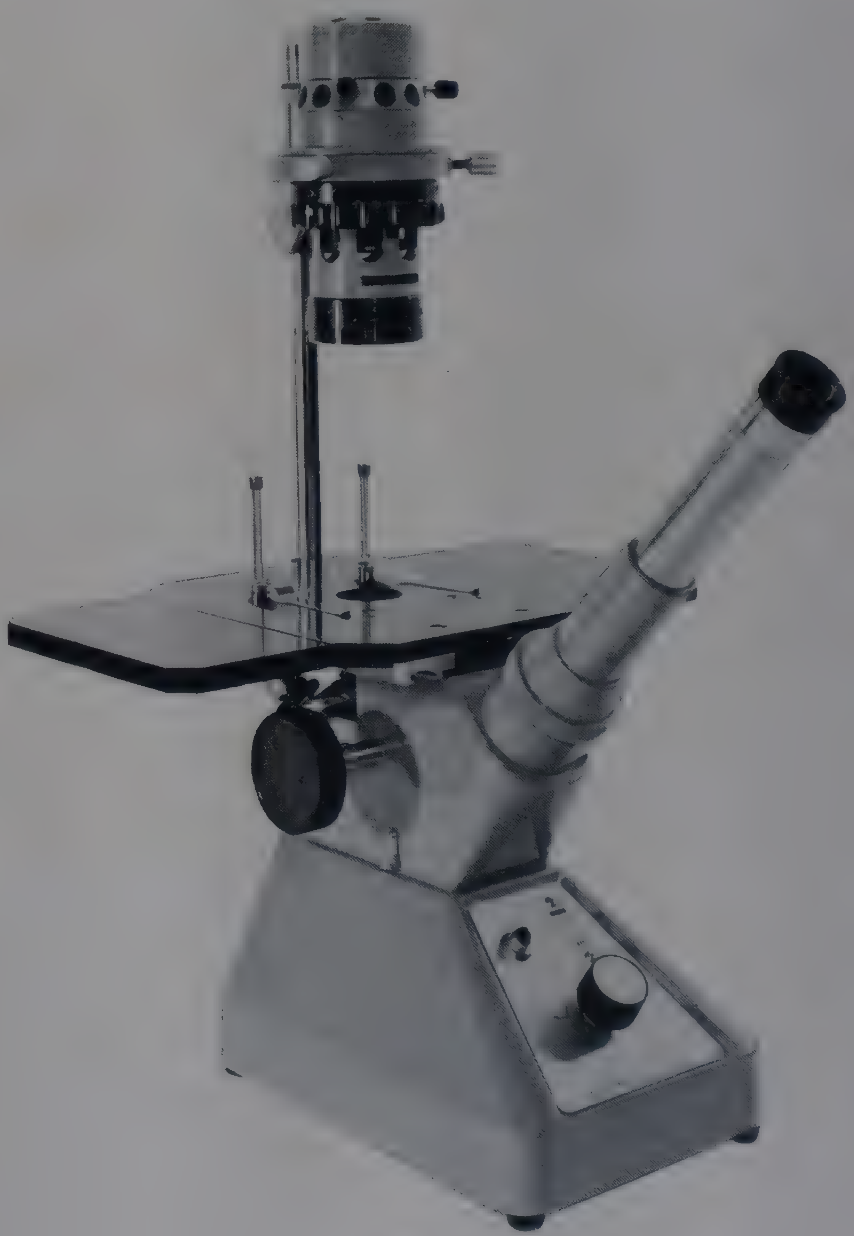
***ML-284**	**Bulb,** 12W, spare for ML-280 and ML-282.	Each	**£0·60**	*px*

ACCESSORIES

***ML-286**	**Objective,** achromatic, long working distance, magnification ×20	Each	**£8·00**	*px*
***ML-287**	**Phase contrast accessory** for ×10 objective.	Each	**£10·50**	*px*
***ML-288**	**Phase contrast accessory** for ×20 objective.	Each	**£10·50**	*px*
***ML-289**	**Polarising attachment**...	Each	**£13·00**	*px*

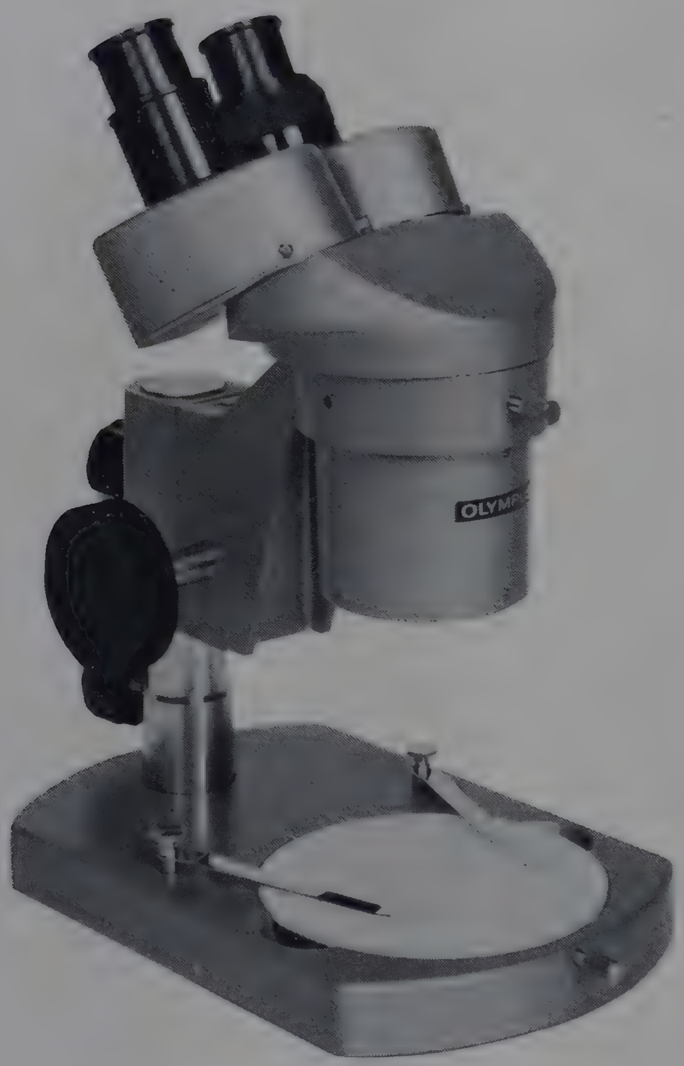
NOTE: The optical elements used with this model are not suitable for use with other *Olympus* microscopes.

- **Image appears upright**
- **Convenient positioning of controls for minimum fatigue and simple operation**
- **Rack and pinion focusing**
- **Phase contrast accessories for ×10 and ×20 objectives and polarizing attachment available**



ML-282

Olympus
MODEL VB STEREOSCOPIC MICROSCOPE



ML-290

A high power, stereoscopic microscope with characteristics which render it especially suitable for dissections, quality control inspections and other applications.

- **Magnifications up to ×160**
- **Erect stereoscopic image**
- **90 mm between specimen and objective provides adequate space for dissecting instruments, etc.**

STAND
Durable acid-resistant finish.

HEAD
Binocular head inclined at 45° and rotatable through 360° with individual dioptre and inter-pupillary adjustments.

EYEPIECES
Wide field G×10 eyepieces supplied with standard equipment. Eyepieces G×15 and G×20 optionally available.

OBJECTIVES
A normal N×4 objective is supplied with the standard equipment providing magnification of ×40 with 5·5 mm visual field diameter. Attachable conversion lenses ×0·5, ×0·75, ×1·5 and ×2 optionally available.

STAGE
Supplied with transparent glass stage plate, reversible black/white plastics stage plate and pair of removable stage clips.

FOCUSING
Single focusing movement of 40 mm by rack and pinion mechanism. A further movement of 37 mm is possible by adjustment on the pillar.

BODY
Rotates horizontally about the pillar; clamping screw provided.

***ML-290**

MICROSCOPE, *Olympus* **Model VB454,** as specification, with white/black plastics plate, G×10 eyepieces with caps, N×4 objective, and plastics dust cover.
Each **£99·00** *px*

ACCESSORIES

***ML-293**	**Conversion lens, ×0·5**	Each	**£11·50** *px*
***ML-294**	**Conversion lens, ×0·75**	Each	**£10·25** *px*
***ML-295**	**Conversion lens, ×1·5**...	Each	**£10·25** *px*
***ML-296**	**Conversion lens, ×2·0**...	Each	**£10·25** *px*
ML-650	**Eyepieces, G×15 and G×20** ...	For details and prices see entries in List No. sequence.	
ML-680	**Micrometer eyepiece**		
ML-804	**Epi-illuminator, Model LSG-II** ...		
ML-820	**Trans-illuminating substage base.**		
ML-823	**Iris diaphragm for ML-820**		

NOTE: Model VB Stereoscopic Microscope is available also with heads inclined at 60° and 90° and with built-in objectives N×1 and N×2 to special order.

For Lens Codes see pages 446/447.

Eyepiece	Objective	Conversion lenses Working distance	0·5× 155 mm	0·75× 100 mm	None 90 mm	1·5× 42 mm	2× 28 mm
†G10×	1×	Magnifications Visual field diameter	5× 44 mm	7·5× 29·3 mm	10× 22 mm	15× 14·7 mm	20× 11 mm
	2×	Magnifications Visual field diameter	10× 22 mm	15× 14·7 mm	20× 11 mm	30× 7·3 mm	40× 5·5 mm
	†4×	Magnifications Visual field diameter	20× 11 mm	30× 7·3 mm	40× 5·5 mm	60× 3·7 mm	80× 2·7 mm
G20×	1×	Magnifications Visual field diameter	10× 24·4 mm	15× 16·2 mm	20× 12·2 mm	30× 8·1 mm	40× 6·1 mm
	2×	Magnifications Visual field diameter	20× 12·2 mm	30× 8·1 mm	40× 6·1 mm	60× 4 mm	80× 3 mm
	4×	Magnifications Visual field diameter	40× 6·1 mm	60× 4 mm	80× 3 mm	120× 2 mm	160× 1·5 mm

† Fitted as standard to ML-290. Alternative objectives are not interchangeable. Quotations for alternative assemblies on request.

Olympus
LOW POWER STEREOSCOPIC MICROSCOPE VT-11

Low cost stereoscopic microscope with distortion-free optics. This functional microscope is valuable in the fields of science, education and medicine.

STAND
Acid-resistant and chromium-plated with rubber bumpers. Incorporates a hand-grip for correct and safe carrying.

HEAD
Binocular head with interpupillary adjustment. Detaches from stand for use on ML-830 Universal stand and ML-318 long-arm stand.

EYEPIECES
Independent focusing of left eyepiece provides means of obtaining critically sharp images. Paired G×10 eyepieces provide large, distortion-free field.

OBJECTIVES
Turret with twin paired objectives for instantaneous magnification change.

STAGE
Supplied with transparent glass stage plate, reversible black/white plastics stage plate and pair of removable stage clips.

FOCUSING
Rack and pinion focus mechanism, range 50 mm.

***ML-315**

MICROSCOPE, *Olympus* **Model VT-11,** as specification, including optical elements. Supplied with plastics dust cover and fitted hardwood case with lock and key.
Each **£88·00** *px*

For Lens Codes see pages 446/447.

ACCESSORIES

ML-650	**Eyepieces, G×15 and G×20** ...
ML-680	**Micrometer eyepiece** ... ...
ML-804	**Epi-illuminator, Model LSG-11** ...
ML-820	**Trans-illuminating substage base.**
ML-823	**Iris diaphragm for ML-820** ... ...
ML-830	**Universal stand Model VS-IV** ...

For details and prices see entries in List No. sequence.

- **Stereoscopic viewing minimises eye-strain**
- **Natural, vivid images are erect and unreversed**
- **Optical elements are hard-coated for high transmission**

ML-315

NOTE: The head and focusing mechanism part only of ML-315 can be supplied separately for use on stand ML-318. Quotation on request.

Objective	Working distance	Wide field eyepiece G×10		Wide field eyepiece G×15		Wide field eyepiece G×20	
		Magnification	Field of view (mm dia.)	Magnification	Field of view (mm dia.)	Magnification	Field of view (mm dia.)
N/1	128 mm	×10	20	×15	15	×20	10
N/2	78 mm	×20	10	×30	7·5	×40	5

Gallenkamp LONG ARM STAND

ML-318

LONG ARM STAND, *Gallenkamp*, for use with *Olympus* microscope ML-315. A heavy base, with two holes for storage of eyepieces, supports a vertical pillar which has a horizontal arm 12 cm long for holding the microscope. The arm rotates through 360° and can be clamped in any position. An adjustable locking collar prevents the arm from moving down the vertical pillar.

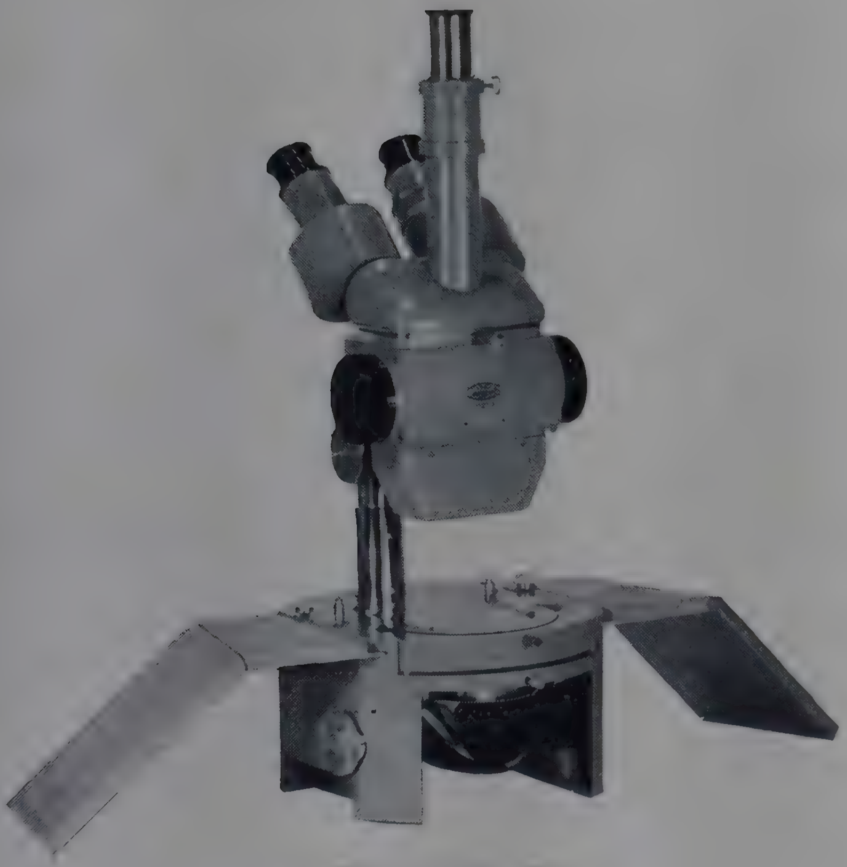
Overall height	33 cm
Base	25 cm wide × 30 cm deep
Weight	12 kg

Each **£18·50** *bx*

ML-318 with microscope

Olympus
SERIES X STEREOSCOPIC MICROSCOPES

- **Erect stereoscopic image**
- **Individual interpupillary and dioptre adjustment to compensate for personal visual acuity of user**
- **Rapid change of magnification**



ML-328 with ML-820

For plant classification, entomology, anatomy, geology and other applications.

Binocular and trinocular stereoscopic wide field microscopes with magnification selector knobs. Fixed optics ensure the highest resolution and freedom from distortion in stereomicroscopy. Model with trinocular head is for photomicrography.

STAND

Robust stand with adjustable pillar.

HEAD

The inclined binocular head permits a natural viewing position and reduces user fatigue.

EYEPIECES

Wide field eyepieces G × 10 and G × 20 provided.

STAGE

Supplied with transparent glass stage plate, reversible black/white plastics stage plate and pair of removable stage clips. The working depth between the stage and the objective varies from 47 to 90 mm depending upon magnification.

MAGNIFICATION

The drum selector gives five different magnifications simply by turning a knob.

***ML-325**

MICROSCOPE, *Olympus* **Model X,** as specification with N × 1 objective. Includes fitted case with lock and key ... ... Each **£198·00** *px*

***ML-328**

MICROSCOPE, *Olympus* **Model X-Tr,** as ML-325 but including trinocular head and × 10 parfocal eyepiece for photomicrography and a fixed N × 1 objective. Each **£255·00** *px*

ACCESSORIES

***ML-329**	**Objective,** N × 2 for use with microscope ML-325 only.	Each **£25·50** *px*
ML-650	**Eyepieces,** G × 15 and G × 20 ...	For details and prices see entries in List No. sequence.
ML-680	**Micrometer eyepiece**	
ML-804	**Epi-illuminator, Model LSG-II** ...	
ML-820	**Trans-illuminating substage base.**	
ML-823	**Iris diaphragm for ML-820**	
ML-830	**Universal stand Model VS-IV** ...	
ML-900	**Photomicrographic apparatus, Model PM6**	

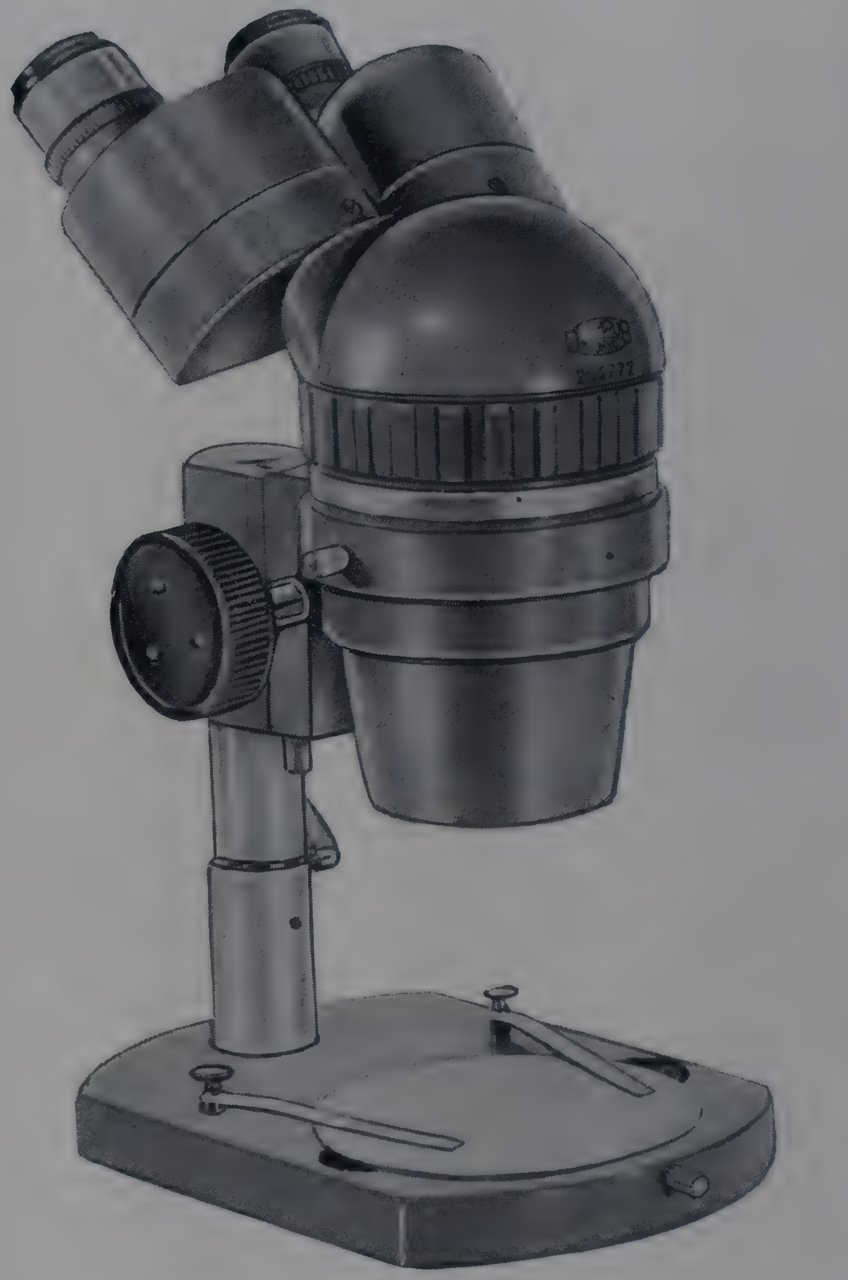
For Lens Codes see pages 446/447.

Objectives	G × 10 Eyepieces		G × 20 Eyepieces	
	Magnification range	Field of view (mm dia.)	Magnification range	Field of view (mm dia.)
N × 1	× 6·3 to × 40	32 to 5·0	× 12·6 to × 80	16 to 2·5
N × 2	× 12·6 to × 80	16 to 2·5	× 25·2 to × 160	8 to 1·25

Olympus
MODEL SZ-III STEREOSCOPIC ZOOM MICROSCOPE

A general purpose stereoscopic zoom microscope with a zoom ratio of 5·7 : 1 with applications in botany, zoology, mineralogy and other sciences.

- **Continuous magnification from ×7 to ×40 without defocusing**
- **Alternative optical elements provide magnification ranges from ×3·5 to ×160**
- **Perfect stereoscopic and erect images**



ML-350

STAND
Durable acid-resistant finish.

HEAD
Binocular head inclined at 45° and rotatable through 360° with individual dioptre and inter-pupillary adjustments on each eyepiece. Magnification ratio indicated on graduated ring.

EYEPIECES
Wide field G×10 eyepieces supplied with standard equipment.

OBJECTIVES
A built-in NZ×1 objective is supplied with the standard equipment. **Conversion lenses** for alternative magnifications are listed under accessories below

STAGE
Supplied with transparent glass stage plate, reversible black/white plastics stage plate and pair of removable stage clips.

FOCUSING
Single focusing movement by rack and pinion mechanism.

***ML-350**

MICROSCOPE, *Olympus* **Model SZ-III,** as specification, with clear and opaque stage plates, eyepiece caps, eyepiece shades, plastics dust cover and wooden cabinet.
Each **£185·00** *px*

ACCESSORIES

***ML-352**	**Conversion lens,** ×0·5 with extension pillar.	Each **£19·00** *px*
***ML-354**	**Conversion lens,** ×0·75	Each **£7·80** *px*
***ML-356**	**Conversion lens,** ×1·5...	Each **£10·25** *px*
***ML-358**	**Conversion lens,** ×2	Each **£10·25** *px*
ML-650	**Eyepieces,** G×15 and G×20 ...	For details and prices see entries in List No. sequence.
ML-680	**Micrometer eyepiece**	
ML-804	**Epi-illuminator, Model LSG-II** ...	
ML-820	**Trans-illuminating substage base.**	
ML-823	**Iris diaphragm for ML-820**	
ML-830	**Universal stand Model VS-IV** ...	

For Lens Codes see pages 446/447.

NOTE: The head and focusing mechanism part only of ML-350 can be supplied separately for use on stand ML-830. Quotation on request.

Objective assembly		G×10 Eyepieces		G×20 Eyepieces	
Conversion lens	Working distance	Magnification ranges	Field of view (mm dia.)	Magnification ranges	Field of view (mm dia.)
×0·5	166 mm	×3·5 to ×20	62·9 to 11·0	×7 to ×40	34·8 to 6·1
×0·75	111 mm	×5·3 to ×30	41·9 to 7·3	×10·5 to ×60	23·2 to 4·1
None	97 mm	×7 to ×40	31·4 to 5·5	×14 to ×80	17·4 to 3·1
×1·5	52 mm	×10·5 to ×60	21·0 to 3·7	×21 to ×120	11·6 to 2·0
×2	36 mm	×14 to ×80	15·6 to 2·8	×28 to ×160	8·7 to 1·5

Olympus OBJECTIVES for Biological Microscopes

All objectives are corrected for chromatic aberration and are parfocal, interchangeable and fluoride coated for maximum contrast and resolution.

All objectives (except those for stereoscopic microscopes) are colour coded.

LENS CODE

N — Normal dry system.

NZ — Normal dry system for zoom microscope.

S — Spring mounted.

I — Iris diaphragm.

Pl — Planachromatic, flat field.

Fl — Fluorite, semi-apochromatic.

A — Apochromatic.

Pa — Planapochromatic.

No.	Type	Individual magnification	Numerical aperture	Focal length mm	Working distance mm	N.A. Condenser	Remarks	Code	Each	
*ML-500	**Normal** Dry system	×4	0·10	29·2	35·0	1·25		N	£ 4·60	px
		×10	0·25	15·8	5·6	1·25		N	5·50	px
		×20	0·40	8·1	1·55	1·25		N	8·00	px
		×40	0·65	4·4	0·56	1·25		N	10·50	px
		×60	0·80	2·8	0·26	1·25		N	11·50	px
*ML-502		×40	0·65	4·4	0·49	1·25	For use when object not covered by cover glass	N	10·50	px
*ML-504	**Iris Diaphragm** Oil immersion	×100	1·30	1·8	0·14	Dark field condenser	For dark field work	N.I	26·00	px
*ML-506	**Spring Mounted** Dry system	×40	0·65	4·4	0·56	1·25	Avoids slide breakage	N.S	14·50	px
	Oil immersion	×100	1·30	1·8	0·14	1·25	Avoids slide breakage	S	23·50	px
*ML-530	**Planachromatic** Dry system	×1·3 (see Note 2)	0·03	40·3	38·68	0·22	Flat field	Pl	16·00	px
		×2 (see Note 2)	0·05	44·1	42·20	0·22	,,	Pl	17·25	px
		×4	0·10	31·3	5·78	1·25	,,	Pl	17·25	px
		×10	0·25	14·3	0·84	1·25	,, Spring mounted	Pl	20·00	px
		×20	0·40	8·1	0·73	1·25	,,	Pl	26·00	px
		×40	0·63	4·3	0·24	1·25	,,	Pl.S	37·00	px
	Oil immersion	×100	1·25	1·7	0·17	1·25	,,	Pl.S	90·00	px
*ML-550 (See Note 1)	**Semi-apochromatic** (Fluorite) Dry system	×40	0·75	4·4	0·49	1·25 or 1·4		Fl	26·00	px
	Oil immersion	×100	1·30	1·7	0·11		with iris diaphragm	Fl.I	48·50	px

NOTE 1: Semi-apochromatic objectives (fluorite) are corrected for chromatic aberration, leaving a secondary spectrum $<\frac{1}{10}\lambda$ for every colour. They can be used for taking colour photographs.

NOTE 2: Low power objectives ML-530 ×1·3 and ×2 should be used with special condenser ML-720 which has a N.A. of 0·22.

Olympus OBJECTIVES for Biological Microscopes

(continued)

No.	Type	Individual magnification	Numerical aperture	Focal length mm	Working distance mm	N.A. Condenser	Remarks	Code	Each	
*ML-560	**Apochromatic** Dry system	×40	0·85	4·33	0·23	1·4	Must be used with condenser ML-704	A	£ 87·50	px
(See Note 1)	Oil immersion	×40	1·00	4·38	0·21	1·4		A	75·00	px
*ML-570	**Plan-apochromatic** Dry system	×10	0·32	14·18	0·12	1·4		Pa	62·50	px
(See Note 2)		×20	0·65	7·56	0·13	1·4		Pa	91·00	px
		×4, ×40 and ×100 oil immersion planapochromatic objectives. Details and prices on application.								

NOTE 1: Apochromatic objectives have a high aperture corrected fully for achromatic and spherical aberrations and give maximum definition.

NOTE 2: Planapochromatic objectives are further corrected for flatness of field and give excellent results in photomicrography.

Olympus EYEPIECES for Biological Microscopes

All eyepieces are hard coated for high transmission and quality definition.

LENS CODE

H — Huygenian.
R — Ramsden.
P — Compensated for chromatic aberration and distortion of objectives.
K — As P, but for use with high power or fluorite objectives.
WF — Wide field.
Bi — Binocular.
G — Paired Greenough type stereoscopic eyepieces.
FK — Photographic eyepieces.
HEP — High eye point for spectacle wearers.

SINGLE EYEPIECES

No.	Type	Magnification	Focal length mm	Field No.	Code	Remarks	Each	
*ML-600	Huygenian	×5	50	21	H	Especially effective with low power objectives	£ 2·70	px
		×7	36	18	H		2·70	px
		×10	25	13	H		2·70	px
*ML-610	Compensation	×5	50	18	P	Compensate for chromatic aberration distortion of objective ×7, ×10 and ×15 eyepieces are suitable for photographic use	6·75	px
		×7	36	18	P		6·75	px
		×10	25	13	P		6·75	px
		×15	16·7	9·5	P		6·75	px
		×20	12·5	7·5	K	For use with high power or fluorite objectives	7·80	px
*ML-612		×10	25	13	P	Has movable pointer for indicating details of specimen	6·75	px
*ML-630	Wide field	×10	25	18	WF	Provide large flat field of view	6·75	px
		×15	16·7	12	WF		6·75	px
*ML-635	For phototube	×2·5	54·3	17·3	FK	For photomicrography Field No. figures are for 35 mm format	5·25	px
		×3·3	38·6	13·1	FK		5·25	px
		×5·0	25·2	8·6	FK		6·20	px
		×6·7	18·6	6·4	FK		7·50	px

Paired eyepieces—see overleaf

Olympus EYEPIECES for Biological Microscopes

(continued)

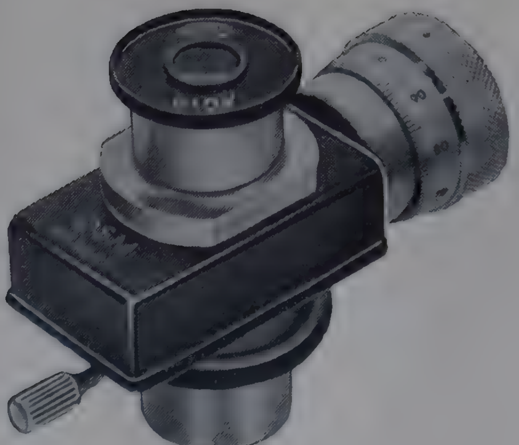
PAIRED EYEPIECES

No.	Type	Magnification	Focal length mm	Field No.	Code	Remarks	Pair	
***ML-640**	Compensation	×7	36	18	BiP	Supplied in pairs	**13·50**	*px*
		×10	25	13	BiP		**13·50**	*px*
		×15	16·7	9·5	BiP		**13·50**	*px*
		×20	12·5	7·5	BiK		**15·60**	*px*
***ML-642**	Wide field	×10	25	18	BiWF	Supplied in pairs	**15·60**	*px*
		×15	16·7	12	BiWF		**15·60**	*px*
***ML-644**	Wide field high eyepoint for spectacle wearers	×10	25	18	BiHEPWF	Supplied in pairs	**19·00**	*px*

No.	Type	Magnification	Focal length mm	Field No.	Code	Pair	
***ML-650**	**For Stereoscopic Microscopes** Wide field	×10	25	20	G	**13·00**	*px*
		×15	16·7	13	G	**13·00**	*px*
		×20	12·5	10	G	**13·00**	*px*

Olympus MICROMETER EYEPIECES

The use of a micrometer eyepiece enables measurements to be made without eyestrain and parallax effects.



ML-660

***ML-660**

MICROMETER EYEPIECE, Filar, *Olympus* **Model OSM,** magnification ×10. Can be inserted into the eyepiece sleeve on a monocular, binocular or trinocular head. An accurate measurement of 0·0001 mm is possible when using an ×100 objective ... ... Each **£31·00** *px*

***ML-670**

COMPENSATION MICROMETER EYEPIECE, *Olympus*, 10 mm/100. Magnification ×7. Focal length 36 mm. Field number 18 ... ... Each **£9·20** *px*

***ML-674**

COMPENSATION MICROMETER EYEPIECE, wide field, *Olympus*, 10 mm/100. Magnification ×10. Focal length 25 mm. Field number 18 ... Each **£9·20** *px*

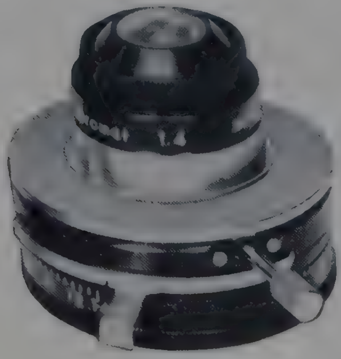
NOTE: Details of suitable 19 mm dia. graticules—see EYEPIECE GRATICULES MP-710 et seq. on page 456.

***ML-680**

MICROMETER EYEPIECE, *Olympus*, G×10, with 10 mm linear graticule divided into 100. For use with stereoscopic microscopes ... ... Each **£12·75** *px*

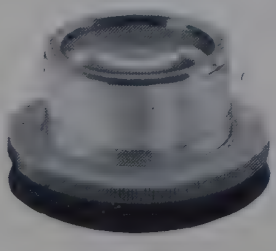
All the micrometer eyepieces listed above include an auxiliary focusing top lens.

ML-700



ML-704

ML-710



ML-720

ML-730

Olympus CONDENSERS

*ML-700
CONDENSER, *Olympus,* **Abbé type,** N.A. 1·25, with variable iris diaphragm ... ... Each **£12·00** *px*

*ML-704
CONDENSER, *Olympus,* **achromatic/aplanatic,** N.A. 1·4, with variable iris diaphragm and swing-out filter holder. Ensures maximum definition from high N.A. objectives ... ... Each **£50·50** *px*

*ML-710
CONDENSER, *Olympus,* **swing-out,** N.A. 0·9–0·25, with variable iris diaphragm. Useful where low and medium power objectives are used in conjunction with external illuminator when difficulty may be experienced in obtaining a fully illuminated field ... Each **£17·25** *px*

*ML-720
CONDENSER, *Olympus,* N.A. 0·22 for use only with ×1·3 and ×2 achromatic objectives ... Each **£8·00** *px*

*ML-730
CONDENSER, dark-field, *Olympus,* **Model DC,** for observation of transparent specimens. For oil immersion ×100 applications, objectives ML-504 or ML-550 must be used... ... ... Each **£26·75** *px*

*ML-732
CONDENSER, *Olympus,* **Model DC-6,** N.A. 1·2–1·4, glycerine immersion, for high power, dark field applications. Has a wide field and permits the use of wide field eyepieces. Suitable for use with objectives ×10 to oil immersion ×100 ... ... Each **£50·50** *px*

Olympus ILLUMINATORS

*ML-800
ILLUMINATOR, Substage, *Olympus,* **Model LSK-II.** With 20W lamp and two spares; requires no transformer. For use with microscopes ML-070, ML-072, ML-075 and ML-080. For 220/240V a.c. or d.c. supplies. Each **£6·50** *px*

***ML-801 Replacement lamp, 20W** ... ... Each **£0·60** *px*

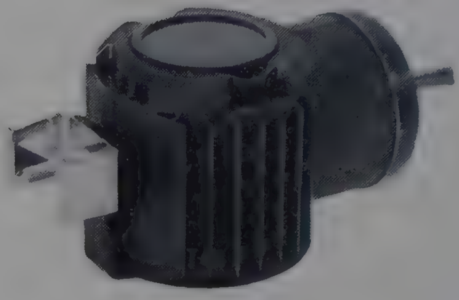
*ML-802
ILLUMINATOR, Universal, *Olympus,* **Model LSD.** With adjustable light intensity and focusing. Provides high quality Köhler illumination. Includes adjustable output transformer in ventilated case with voltmeter, pilot lamp and two spare lamps. For 220/240V a.c. single phase supplies ... ... Each **£44·50** *px*

***ML-803 Replacement lamp, 30W** ... ... Each **£0·80** *px*

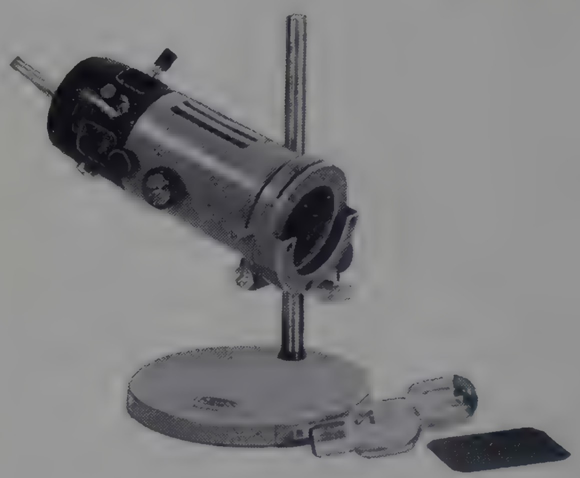
*ML-804
EPI-ILLUMINATOR, *Olympus,* **Model LSG-II,** for stereoscopic microscopes. With light focusing facility and adjustable output transformer in ventilated case fitted with pilot lamp. Includes two spare lamps. For 220/240V a.c. single phase supplies ... Each **£26·75** *px*

When ordering please state List No. of microscope for which ML-804 is required.

***ML-805 Replacement lamp, 12W** ... ... Each **£0·60** *px*

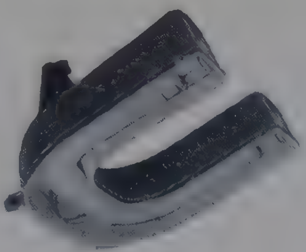


ML-800



ML-802 on stand,
without transformer

ML-804
without transformer



ML-806
without choke

*ML-806
ILLUMINATOR, *Olympus,* **Model VL-FL,** with fluorescent tube for stereoscopic microscopes. Includes choke for 220/240V a.c. single phase supplies. Each **£44·75** *px*

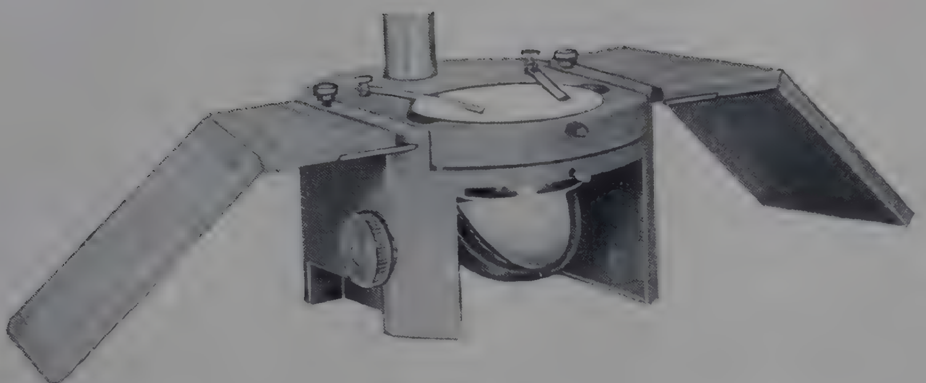
***ML-807 Replacement fluorescent tube** ... Each **£5·50** *px*

ML-818

Olympus TRANSFORMER

*ML-818
TRANSFORMER, *Olympus*, **Model TE-II,** variable output, for use with microscopes Series EH and FH. Mounted in ventilated case fitted with voltmeter and pilot lamp. For 220/240V single phase supplies, maximum output 6V 5A ... ... Each **£19·00** *px*

When ordering electrical accessories please state voltage and frequency of supply.



ML-820

Olympus STANDS FOR STEREOSCOPIC MICROSCOPES

*ML-820
TRANS-ILLUMINATING SUBSTAGE BASE, *Olympus*, with fork-mounted adjustable mirror with polished metal finish on one side for use with lamps and matt white finish on the other for use with daylight. A 20W illuminator is incorporated in the back of the stand. Complete with inclined arm rests and two spare lamps. For 220/240V a.c. or d.c. supplies ... Each **£25·50** *px*

REPLACEMENT PARTS AND ACCESSORIES

***ML-821**	**Replacement lamp, 20W**	Each	**£0·60**	*px*
***ML-823**	**Iris diaphragm for ML-820**	Each	**£7·80**	*px*

When ordering please state voltage and frequency of supply.

*ML-830
STAND, Universal, Model VS-IV, for examining large objects with any *Olympus* stereoscopic microscope.
Each **£47·00** *px*

PHASE CONTRAST

ML-860

Olympus PHASE CONTRAST OUTFIT

Phase contrast equipment is used for the study of transparent specimens, such as living cells or materials which are not easily stained. All outfits have an iris diaphragm on the rotating assembly and this allows the condenser to be used with normal bright field illumination as required.

*ML-860
PHASE CONTRAST OUTFIT, *Olympus*, **Model PB,** positive phase, low absorption. Comprises four objectives ×10, ×20, ×40 and ×100, one substage condenser assembly with iris diaphragm, one centring telescope and one green filter. In wood cabinet ... Each **£105·00** *px*

Outfits are also available in positive phase, extra low absorption and in negative phase, medium and low absorption—details on request.

ML-900

Olympus PHOTOMICROGRAPHIC OUTFIT PM-6

- **Specimen may be observed while photographing**
- **35 mm full-frame format**

*ML-900
PHOTOMICROGRAPHIC OUTFIT, *Olympus*, **Model PM-6,** with 35 mm camera and pre-cocking shutter which minimises vibration effects. Shutter speeds $^{1}/_{50}$ to 1 sec with provision for brief and timed exposure. A three position switch allows for monitoring and exposure meter connection. With monitoring eyepiece which has dioptre adjustment and a format frame. Complete with cable release. In wood case ... Each **£76·50** *px*

ACCESSORY

***ML-908**	**Adapter,** to enable ML-900 to be used with *Olympus* stereoscopic microscopes	Each	**£5·25**	*px*

Olympus
PHOTOMICROGRAPHIC OUTFITS
PM-10

A modular system suitable for standard microscopes. Outfits may be built-up as required.

- **Manual or automatic bodies**
- **Camera backs interchangeable**

PHOTOMICROGRAPHIC OUTFITS, *Olympus*, **PM-10 series,** comprising main body, viewing system and eyepiece and camera back or adapter (see NOTE 1 below). **Require but do not include photomicrographic eyepieces ML-635.**

List No.	Model No.	Camera type	Each	
			£	
***ML-910**	PM-10-35M	35 mm manual	**162·00**	*pxN*
***ML-911**	PM-10-35A	35 mm automatic	**629·00**	*pxN*
***ML-912**	PM-10-L1M	4×5 in manual	**222·00**	*pxN*
***ML-913**	PM-10-L1A	4×5 in automatic	**659·00**	*pxN*
***ML-914**	PM-10-L2M	3¼×4¼ in *Polaroid* manual	**269·00**	*pxN*
***ML-915**	PM-10-L2A	3¼×4¼ in *Polaroid* automatic	**707·00**	*pxN*
***ML-916**	PM-10-L3M	120 roll manual	**228·00**	*pxN*
***ML-917**	PM-10-L3A	120 roll automatic	**666·00**	*pxN*

NOTE 1:

ML-912 and ML-913 are supplied with an adapter only which accepts any standard 4×5 in plate holder. All other models are supplied with the appropriate camera back.

NOTE 2:

When required for use exclusively with the Olympus Vanox Microscope ML-260 it is possible to dispense with some components from the above. Quotations for such simplified outfits on request.

ACCESSORIES

***ML-925**	**Filters.** Set comprising three colour temperature compensation filters and four neutral density filters.	Set	**£28·75**	*px*
***ML-927**	**Screen viewer**	Each	**£21·00**	*px*
***ML-929**	**Loupe,** ×5, for screen focusing of ML-927.	Each	**£5·50**	*px*

The following eyepieces ML-931 to ML-935 are for use with the Vanox microscope ML-260 only.

ML-635	**Eyepieces,** photomicrographic. For details and prices see entries in List No. sequence.			
***ML-931**	**Eyepiece,** field of view, WF×10, for focusing front lens and reticule for 35 mm format	Each	**£17·50**	*px*
***ML-932**	**Eyepiece,** as ML-931 but for 4×5 in format.	Each	**£17·50**	*px*
***ML-933**	**Eyepiece,** as ML-931 but for 3¼×4¼ in *Polaroid* format.	Each	**£17·50**	*px*
***ML-935**	**Eyepiece,** field of view, WF×10, used to make paired eyepieces with ML-931 to ML-933 above.	Each	**£15·50**	*px*

Many additional accessories are available to increase the versatility of the PM-10 outfits. Details on application.

Olympus
EXPOSURE METER

***ML-940**

EXPOSURE METER, *Olympus*, **Model EMM-VI,** direct reading and incorporating a colour temperature meter.

Film speeds	black and white	6 to 400 ASA
	colour	12 to 800 ASA

Shutter speeds 1/250 to 32 sec direct reading

Colour temperature 3000°K to 6000°K. Each **£118·00** *px*

ML-910

OLYMPUS EMM-6

ML-940

ML-950

Olympus
MICROPROJECTION SCREEN

***ML-950**

MICROPROJECTION SCREEN, *Olympus*, **Model MPS,** with 85 mm diameter ground glass inclined at 10° to the vertical plane and attachable metal hood. Magnification of projected image is $\times\frac{2}{3}$ magnification of the microscope. Suitable for low and medium power objectives only. **Requires but does not include powerful illuminator** ... ... Each **£36·50** *px*

ACCESSORY

ML-802 **Illuminator,** *Olympus* Model LSD. For details and price see entry in List No. sequence.

PRIOR PRIOLUX MONOCULAR MICROSCOPES

A range of modern microscopes selected as being suitable for use in school and college biological laboratories.

MM-156 with additional objective

- **Inclined monocular head**
- **Quadruple nosepiece**
- **Fixed square stage with clips**
- **Substage focusing**
- **Uniform subject illumination from built-in mains lamp**
- **Graduated mechanical stage available**

OBJECTIVES

Magnification	Focal length mm	Numerical Aperture	Working distance mm
×5	24	0·12	27·0
×10	16	0·18	16·5
×40	4	0·70	0·6
×100	2	1·30	oil immersion

The ×40 and ×100 objectives are protected by spring loaded mounts.

MM-152
MICROSCOPE, *Priolux*, as specification with inclined monocular head, ×6 and ×10 Huygenian eyepieces, ×10 and ×40 objectives in revolving nosepiece, Abbé condenser in adjustable rack and pinion substage mount, 25W 220/240V lamp and collecting lens and plastics dust cover ... ... Each **£94·50** *fxN*

MM-154
MICROSCOPE, *Priolux*, as MM-152 above with additional ×100 oil immersion objective ... ... Each **£109·50** *fxN*

MM-156
MICROSCOPE, *Priolux*, as specification, with inclined monocular head, ×6 and ×10 Huygenian eyepieces, ×5, ×10 and ×40 objectives in revolving nosepiece, modified Abbé condenser with swing out top lens for wide field illumination, adjustable rack and pinion condenser sub-stage mount, 25W 220/240V lamp and collecting lens and plastics dust cover ... ... Each **£105·75** *fxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

MM-160 Lamp bulb, 25W 220/240V supplies. Pack of 3 £1·35 *fxN*

ACCESSORIES

MM-162 **Graduated mechanical stage,** horizontal movement 65 mm, vertical movement 25 mm, vernier reading to 0·1 mm ... ... Each **£19·50** *fxN*

HJ-520 **Immersion oil.** For details and price see entry in List No. sequence.

PRIOR PRIOLUX BINOCULAR MICROSCOPES

- Inclined binocular head
- Quadruple nosepiece
- Graduated mechanical stage
- Centring substage condenser
- Uniform subject illumination from built-in mains lamp
- Achromatic and dark ground condensers, Köhler illumination and upright eye-tube available

OBJECTIVES

Magnification	Focal length mm	Numerical aperture	Working distance mm
×10	16	0·28	5·5
×40	4	0·70	0·6
×100	1·8	1·30	oil immersion

The ×40 and ×100 objectives are protected by spring loaded mounts.

MM-170

MICROSCOPE, *Priolux*, as specification, with inclined binocular head, paired ×6 and ×10 Huygenian eyepieces, ×10 and ×40 objectives in quadruple nosepiece, built-in graduated mechanical stage, Abbé condenser in adjustable rack and pinion substage mount with centring device, 25W 220/240V lamp and collecting lens and plastics dust cover. In fitted wood cabinet ... ... Each **£172·75** *fxN*

REPLACEMENT PART

MM-160 **Lamp bulb,** 25W 220/240V supplies. For price see entry in List No. sequence.

MM-174

MICROSCOPE, *Priolux*, as MM-170 but with Aplanatic condenser, ×100 oil immersion lens, 6V 15W lamp and built-in transformer and rheostat for 220/240V supplies. Each **£201·25** *fxN*

MM-176

MICROSCOPE, *Priolux*, as MM-174 but with built-in 6V 15W Köhler illumination and light meter. For 220/240V supplies ... ... Each **£269·75** *fxN*

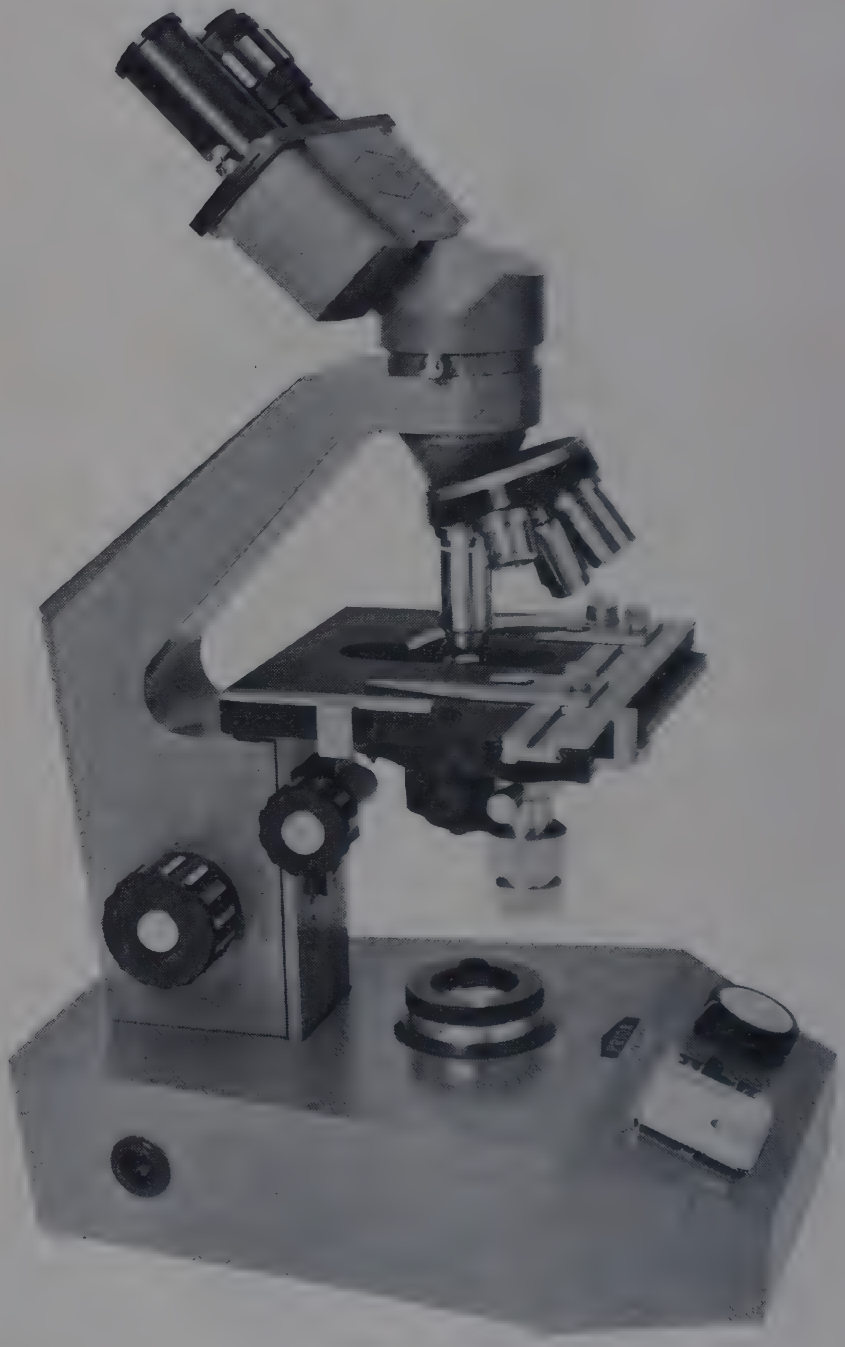
REPLACEMENT PART

MM-180 **Lamp bulb,** 6V, 15W 220/240V supplies. Each **£2·30** *fxN*

When ordering please state voltage and frequency of supply.

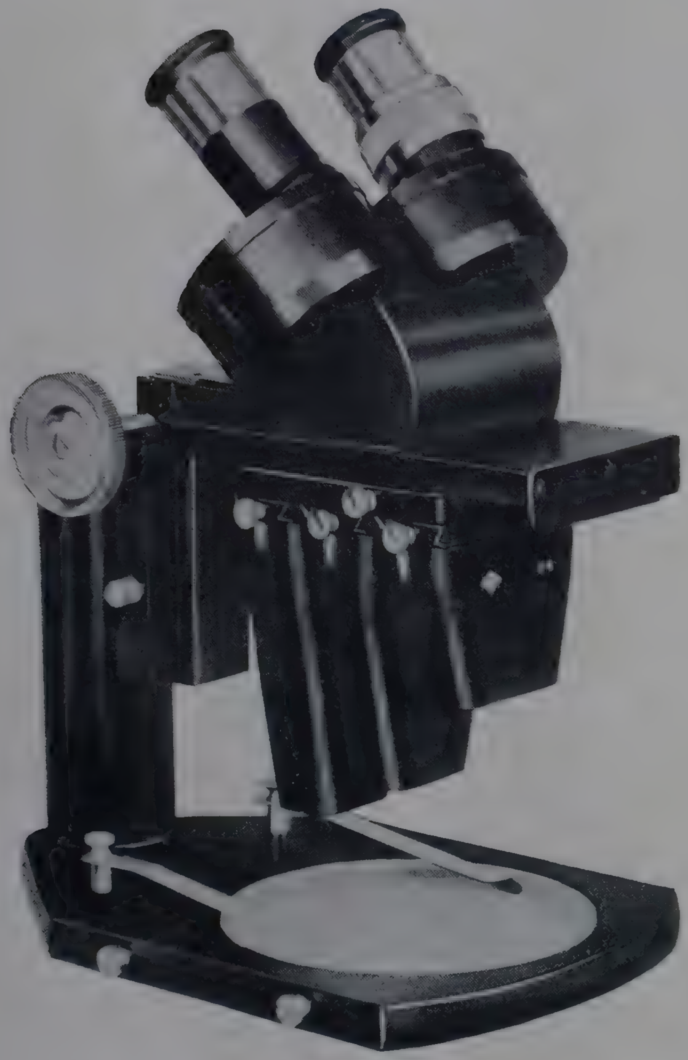
ACCESSORY

HJ-520 **Immersion oil.** For details and price see entry in List No. sequence.



MM-176 with additional objective

PRIOR STEREOSCOPIC MICROSCOPES



MP-304

A range of stereomicroscopes selected as being suitable for applications in medicine, education and industry.

- **Eyepieces inclined at 45°**
- **Adjustment for inter-pupillary distance**
- **Independent focusing compensates for differences between the observer's eyes**

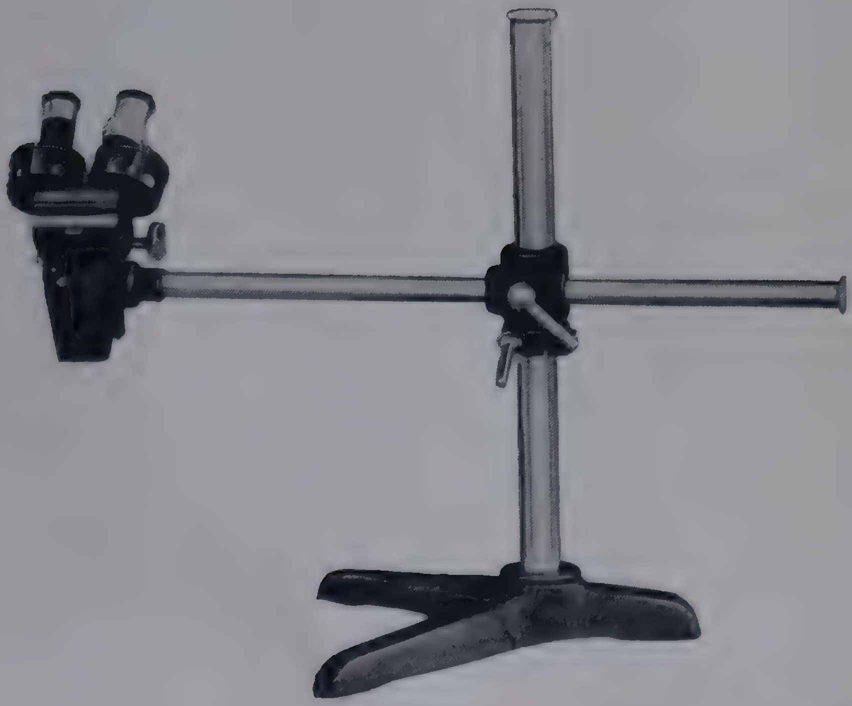
BINOCULAR OPTICAL HEADS

The heads are fitted with inclined ×10 eyepieces for viewing from a seated position. Focusing is by rack and pinion; one eyepiece can be independently focused to compensate for ocular discrepancy and both may be adjusted for interpupillary distances between 50 and 75 mm.

OBJECTIVES

Single or triple nosepiece models are available; objectives are interchangeable being mounted in precision dovetail slides. When more than one objective is fitted in the triple nosepiece, magnification may be changed simply by sliding the assembly backwards or forwards.

Objectives	Magnification	Field of view mm	Working distance mm
×1·4	14	11·5	100
×2·0	20	9·0	82
×4·0	40	4·5	45



MP-312

MP-302

MICROSCOPE, *Prior*, **Stereoscopic,** with inclined binocular head, matched pair of ×10 eyepieces, single nosepiece with matched pair of ×1·4 objectives, and foot with insert circular glass stage with two stage clips. In fitted wood case ... ... Each **£92·00** *fxN*

MP-304

MICROSCOPE, *Prior*, **Stereoscopic,** with inclined binocular head, matched pair of ×10 eyepieces, triple nosepiece with matched pairs of ×1·4 ×2·0 and ×4·0 objectives and foot with insert circular glass stage with two stage clips. In fitted wood case ... Each **£114·00** *fxN*

MP-312

MICROSCOPE, *Prior*, **Stereoscopic, long arm model** with inclined binocular head, matched pair of ×10 eyepieces, single nosepiece with matched pair of ×1·4 objectives and heavily weighted long arm stand.

Each **£90·00** *fxN*

PRIOR STEREOMASTER MICROSCOPE

A free standing stereoscopic microscope with built-in top illumination for the examination of surfaces or solid objects. The *Stereomaster* is suitable for Nuffield 'O' and 'A' level biology courses.

A heavy base houses a transformer which supplies the low voltage illuminating lamp. A vertical 300 mm steel pillar supports a 250 mm knuckle arm upon which is mounted the focusing mechanism of the optical head which provides an upright image. The prism boxes are coupled for adjustment of interpupillary distance.

MP-410

MP-410
MICROSCOPE, *Prior Stereomaster*, as specification, with ×10 stereoscopic head and dust cover. Working distance 160 mm; field of view 21 mm. For 220/240V a.c. single phase supplies ... ... Each **£50·25** *fx*

REPLACEMENT PART

MP-412 **Lamp bulbs,** 6V, 6W. Ten **£0·90** Each **£0·16** *mx*

ACCESSORIES

MP-414 **Supplementary lens** ×2, overall magnification ×20; working distance 90 mm; field of view 10 mm. Each **£9·00** *fx*

MP-415 **Supplementary lens** ×3·5, overall magnification ×35; working distance 90 mm; field of view 6·5 mm. Each **£12·00** *fxN*

DISSECTING MICROSCOPES
see DR-570 and DR-580 in List No. sequence.

MICROMANIPULATORS

For use in applications where precise controlled movement of tools and probes is required. Vertical movement is by 'coarse' rack and pinion with vernier reading to 0·1 mm and a fine control knob. One revolution of the 'fine' control produces a vertical movement of 0·127 mm. Horizontal movement is by rack and pinion for longitudinal travel and pinion and worm for transverse travel. Each movement has a vernier scale reading to 0·1 mm. The head drilled to accept and clamp three 6·3 mm diameter probes mutually at right angles is fitted to the end of the transverse movement.

MP-600

MP-600
MICROMANIPULATOR, *Prior*, as specification, with standard cast base and vertical, longitudinal and transverse drives ... ... Each **£41·50** *fxN*

MP-602
MICROMANIPULATOR, *Prior*, as MP-600 but with tilt movement which permits the transverse movement to be inclined through 180° and clamped at any angle. Each **£45·00** *fxN*

MP-610
MICROMANIPULATOR, *Prior*, as MP-600 but with magnetic base controlled by a hold/release button, for machine or surface plate mounting ... Each **£48·00** *fxN*

MP-612
MICROMANIPULATOR, *Prior*, as MP-610 but with tilt movement which permits the tranverse movement to be inclined through 180° and changed at any angle. Each **£51·50** *fxN*

NOTE: When ordering MP-600, MP-602, MP-610 and MP-612 right hand model will be supplied unless a left hand model is specified.

ACCESSORIES

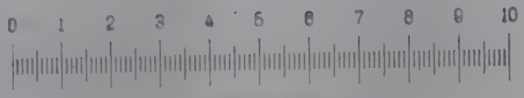
MP-620 **Micro-drive** for 10 mm movement in a single direction, with micrometer reading to 0·01 mm. Fits standard head and accepts standard needle holders. Each **£8·00** *fxN*

MP-622 **Ball and socket joint,** permits needle holder to be set at any angle. Fits standard head ... Each **£3·50** *fxN*

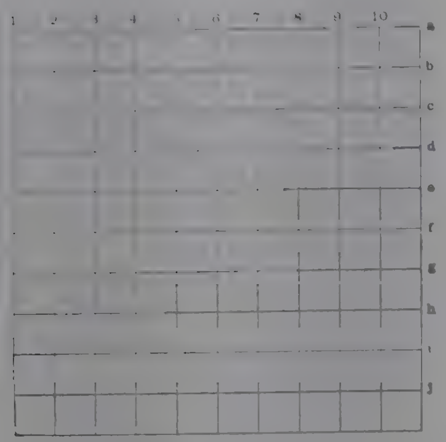
MP-624 **Needle holder** with 6·3 mm dia. shaft to fit standard head and with screw chuck to grip probes from 0 to 1 mm o.d. ... ... Each **£1·00** *fxN*

MP-626 **Needle holder** as MP-624 but to grip probes from 0·75 to 1·5 mm o.d. ... ... Each **£1·00** *fxN*

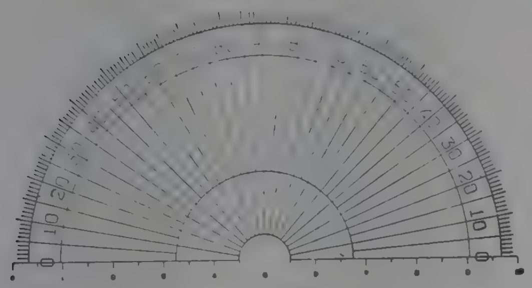
MP-628 **Needle holder** as MP-624 but to grip probes from 1·25 to 3·0 mm o.d. . ... Each **£1·00** *fxN*



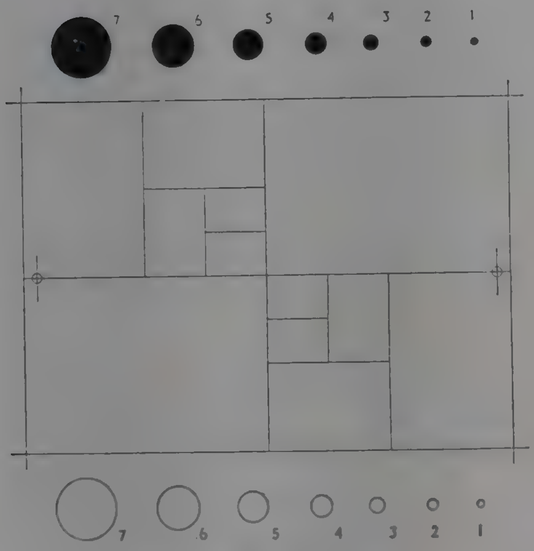
MP-710



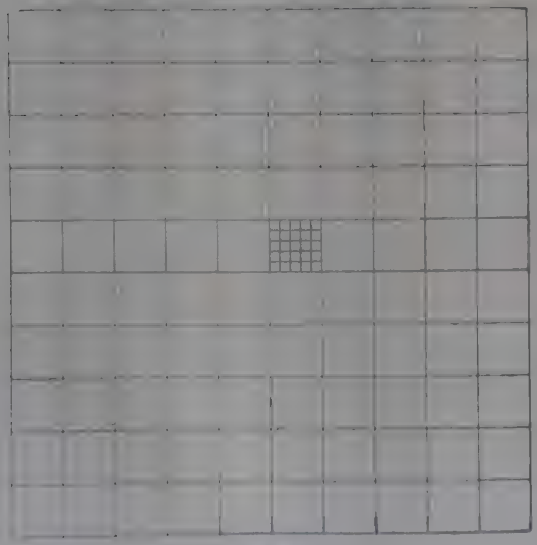
MP-745



MP-760



GRID LENGTH 4·5 mm
MP-763



MP-766

EYEPIECE GRATICULES

Eyepiece graticules mounted on optical glass disks 19·4 mm dia. to fit *Olympus* and most other standard microscope eyepieces. The scales and rulings are in opaque black on a transparent background.

LINEAR RULINGS

List No.	Type of scale	Length	Subdivisions	Each	
				£	
MP-710	Horizontal	10 mm	100 μm	2·40	*mx*
MP-712	,,	2 mm	20 μm	2·50	*mx*
MP-715	Horizontal with crossline	10 mm	100 μm	2·40	*mx*
MP-725	Vertical/Horizontal	10 mm	100 μm	2·40	*mx*

MP-745

EYEPIECE GRATICULE. With one square, 1 cm sides, divided into 100 squares of 1 mm numbered and lettered along two edges ... ... Each **£2·40** *mx*

MP-760

EYEPIECE GRATICULE, half-circle protractor, graduated 0°–90°–0°, on base of 10 mm subdivided in 0·5 mm ... ... Each **£2·40** *mx*

MP-763

EYEPIECE GRATICULE, to BS 3625 for determination of the particle size of powders ... ... Each **£4·20** *mx*

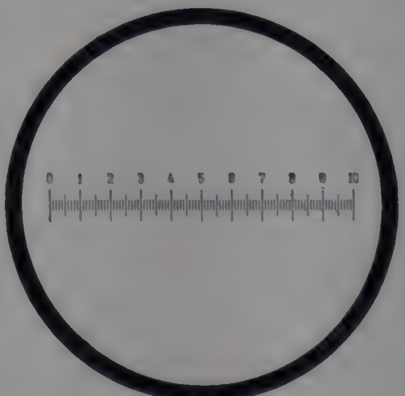
MP-766

EYEPIECE GRATICULE, Whipple, for counting bacteria and for calibrating ... ... Each **£2·40** *mx*

STAGE GRATICULES

Graticules on glass disks mounted in 75×25 mm black anodised slides and supplied in plastics cases.

List No.	Length	Subdivisions	Each	
			£	
MP-770	10 mm	100 μm	3·15	*mx*
MP-772	1 mm	10 μm	3·15	*mx*
MP-773	100 μm	2 μm	6·30	*mx*
MP-774	0·1 in 2 mm	0·0005 in 10 μm	3·70	*mx*



MP-770

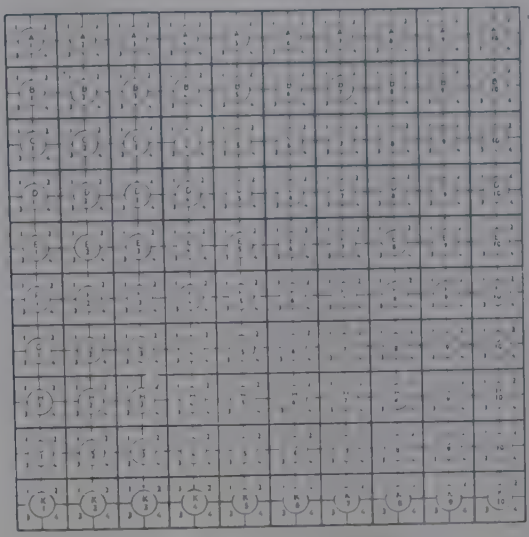
For **slides, cover glasses, handling forceps** and **slide storage cabinets** see HISTOLOGY.

STAGE GRATICULES

(continued)

MP-780

STAGE GRATICULE, England Finder, a 75×25 mm glass slide marked over the whole top surface in such a way that a reference position can be obtained by direct observation. The slide is marked with a square grid at 1 mm intervals. Each square contains a centre ring bearing a reference letter and number; the remainder of the square being subdivided into four segments numbered 1 to 4. All three locating edges are marked with arrow heads and the slide is marked with a positioning label. Complete with instructions ... ... Each **£4·75** *mx*



Section of MP-780

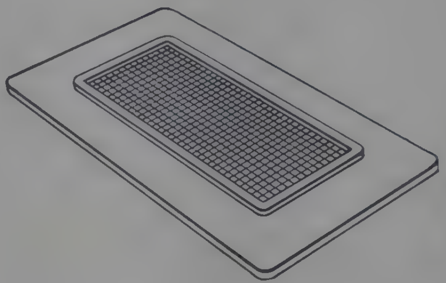
COUNTING CELLS

MP-785

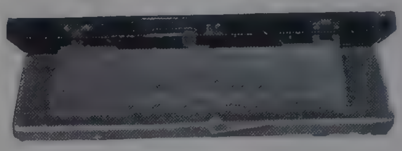
COUNTING CELL, Sedgewick Rafter. A transparent plastics slide with central cell 50×20×1 mm ruled in 1 mm squares, with cover glass to contain 1 ml of liquid. For use in water analysis, particle analysis, etc. Can be used with MP-766 ... ... Each **£1·60** *mx*

MP-790

WORM EGG COUNTING SLIDE, McMaster, for counting parasite eggs from animals. The glass slide, 75×25 mm, has two chambers each 1 cm² counting area and 1·5 mm deep. Particularly suitable for investigating red-worm disease in horses and parasitic gastroenteritis in cattle and sheep. In case ... ... Each **£2·50** *mx*



MP-785



MP-790

MICROSCOPE LAMPS

MP-825

MICROSCOPE LAMP, *Prior,* comprising lamp house for 40W or 60W mains bulb with end cap having a 38 mm hole and holder for 51 mm square filter. The lamp is mounted on a stand 33 cm high with heavy base. The end cap and filter are removable to provide bench illumination for dissecting, etc. Complete with daylight blue filter and 60W bulb. For 220/240V supplies... Each **£3·50** *fx*

MP-826

MICROSCOPE LAMP, *Prior,* as MP-825 but with lever controlled iris diaphragm. Complete with daylight blue filter and 60W bulb. For 220/240V supplies. Each **£6·00** *fx*

MP-855

MICROSCOPE LAMP, HIGH INTENSITY, *Prior,* for transmitted, Köhler or top illumination. The 6V 48W bulb is fitted in a centring mount at the rear of the lamphouse. A lever controlled iris diaphragm is interposed between the lamp and the focusing condenser assembly the front of which has slots for three 51×51 mm filters. The lamphouse is clamped to the stand rod with an adjustable bosshead and the base houses an adjustable output transformer. For 220/240V a.c. single phase supplies. Each **£34·25** *fx*

REPLACEMENT PART

MP-857 Spare bulb, 6V, 48W ... ... Each **£1·60** *fx*

Olympus microscope lamps—see ML-800 et seq. in List No. sequence.

MP-825

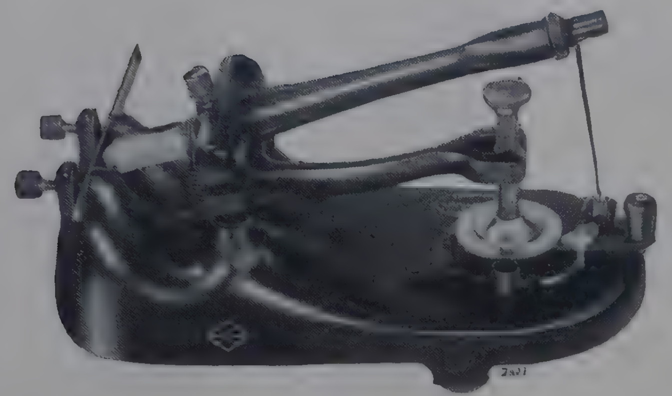
MP-855

DUST COVER

MP-890

DUST COVER, PVC, for microscopes 40 cm maximum height and 30 cm maximum width ... Each **£0·55** *cx*

MICROTOMES



MR-600

ROCKING MICROTOME

For cutting paraffin embedded specimens of comparatively soft tissues and for use as a freezing microtome with the necessary attachment. It will cut long ribbons of sections from specimens not exceeding 20 mm dia. and using the accessory wood blocks, sections of specimens up to 18×25 mm may be cut. The thickness of the sections may be varied between 2 and 24 μm.

Simplicity of operating makes it an ideal instrument for students' use and routine work. Complete with simple object holder, orientating object holder and knife.

MR-600

MICROTOME, ROCKING, *Cambridge*, as specification, for small sections ... ... Each **£65·00** *fx*

REPLACEMENT PART

MR-601	**Knife**	Each	**£4·50**	*fx*

ACCESSORIES

MR-602	**Freezing attachment**	Each	**£40·00**	*fxN*
MR-604	**Object holder,** for wood blocks ...	Each	**£1·50**	*fx*
MR-606	**Blocks, hardwood,** with 22×32 mm mounting face. In packs of 10.			

Thickness	16	22 mm	
10 packs	**£3·00**	**3·00**	*fx*
Pack	**£0·36**	**0·36**	

Aerosol freezer suitable for cooling microtome knives see RJ-550 in List No. sequence.

MR-661

ROTARY MICROTOME

For cutting practically flat sections between 1 and 24 μm of specimens up to 38 × 50 mm. This rotary drive microtome has click-control feed selection and the precise positive mechanical linkages ensure accurate and reproducible specimen thickness. Retraction of the specimen during the return stroke prevents damage to cut sections. The long advance screw, essential for continuous serial sectioning can be reset. Cutting stops automatically at the end of the screw travel, preventing any possibility of damage. The specimen advances automatically at the end of each return stroke. Two knives are available, with 17° and 22° cutting angles for sectioning soft and hard tissues respectively. Knife angle adjustment over a scale, calibrated 0 to 20°, caters for a variety of sectioning conditions. A safety device locks the specimen arm at the top of its travel for safety when changing specimens. All moving parts are enclosed in a sturdy dust cover.

Overall dimensions 49 × 30 × 26 cm high. Weight, net 14·5 kg.

MR-661

MICROTOME, ROTARY ROCKING, *Cambridge*, as specification, with 17° knife for soft tissues, one dozen wood blocks and adapter for securing standard and orientating object holders ... ... Each **£240·00** *fxN*

ACCESSORIES

MR-662	**Knife,** 22°, for hard tissues	Each	**£9·50**	*fx*
MR-664	**Object holder,** standard, for 45 mm specimen.	Each	**£12·50**	*fxN*
MR-665	**Object holder,** orientating, for 45 mm specimen.	Each	**£32·00**	*fxN*
MR-668	**Blocks, hardwood,** 16×38×50 mm. 10 packs **£4·00**	Pack of 10	**£0·45**	*fx*

EMBEDDING APPARATUS

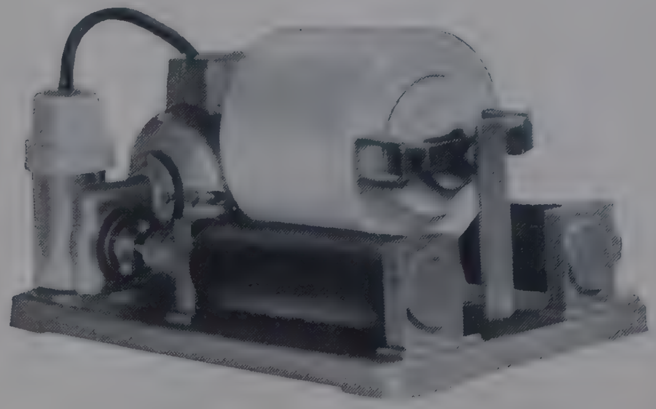
HJ-040	**Wax Embedding Bath,** *Gallenkamp*, maximum temperature 100°C.
HJ-100	**Wax Embedding Oven,** *Gallenkamp*, maximum temperature 100°C.
HJ-145	**Wax Heater/Dispenser,** *Gallenkamp*, maximum temperature 100°C.
HJ-185	**Embedding Trays,** polystyrene with ten recesses each 20×20×13 mm deep.
HJ-190	**Floating-out Bath,** *Gallenkamp*, maximum temperature 80°C.
HJ-230/235	**Vacuum Embedding Baths,** single and double pan models, maximum temperature 82°C.

For full details and prices of above see entries in List No. sequence.

BALL GRINDING MILLS

MU-060

MILL, ball grinding, *Pascall* **Model 9,** material charge approximately 0·5 litre. The 5 cm dia. rubber covered rollers can accommodate containers from 7·6 to 14 cm dia. and 18 cm long, such as a 0·5 or 1·0 litre porcelain pot. The drive is from a fractional hp geared motor giving an output speed of 224 rev/min. Pot speed is approx. 80 rev/min. Bench space required 38×22 cm. For 200/250V 50 Hz single phase supplies. **Without pot or ball charge** ... ... Each **£65·00** *fxN*



MU-060 with MU-080
(MU-065 is similar but larger)

MU-065

MILL, ball grinding, *Pascall* **Model 2,** material charge approximately 2 litres. The rubber covered rollers are 6·4 cm dia.×35 cm long and can be adjusted to accommodate containers from 7·6 cm to 23 cm dia. Suitable pot combinations are 2×0·5 litre, 2×1 litre, 1×2·5 litre or 1×5 litre pots. The drive is from a fractional hp motor giving an output speed of 182 rev/min. Pot speeds vary from approx. 50 to 95 rev/min depending on pot combination used. Bench space required 76×38 cm. For 220/240V 50 Hz single phase supplies. **Without pot or ball charges** ... ... Each **£99·00** *fxN*

MORTARS and PESTLES

see MW-730 et seq. in List No. sequence.

MU-076

MILL, ball grinding, *Pascall* **Model 8,** material charge approximately 4 litres. With two rubber covered rollers 6 cm dia.×90 cm long which can be adjusted to accommodate containers from 12 cm to 24 cm dia. Suitable pot combinations are 2×5 litre, 3×2·5 litre, 5×1 litre or 6×0·5 litre pots. Mounted on steel frame which has two compartments with access doors. One compartment houses the fractional hp motor drive which gives three alternative output speeds of 132, 190 and 277 rev/min. Pot speeds vary from approx. 40 to 145 rev/min depending on speed setting and pot combination used. The second compartment provides useful storage space. Floor space required 102×54 cm. For 220/240V 50 Hz single phase supplies ... ... Each **£255·00** *fxN*

ACCESSORIES for MU-060 to MU-076

MU-080 **Ball mill pots,** hard acid resisting porcelain with ground covers and fittings. Supplied complete with rubber gaskets for use when wet grinding with certain liquids. Requires ball charge MU-081.

Nominal capacity	0·5	1	2·5	5 litres	
Each	£7·50	8·50	11·00	13·00	*fx*

MU-081 **Ball charges,** comprising fused magnesium silicate balls of different diameters selected as being suitable for appropriate ball mill pot capacities.

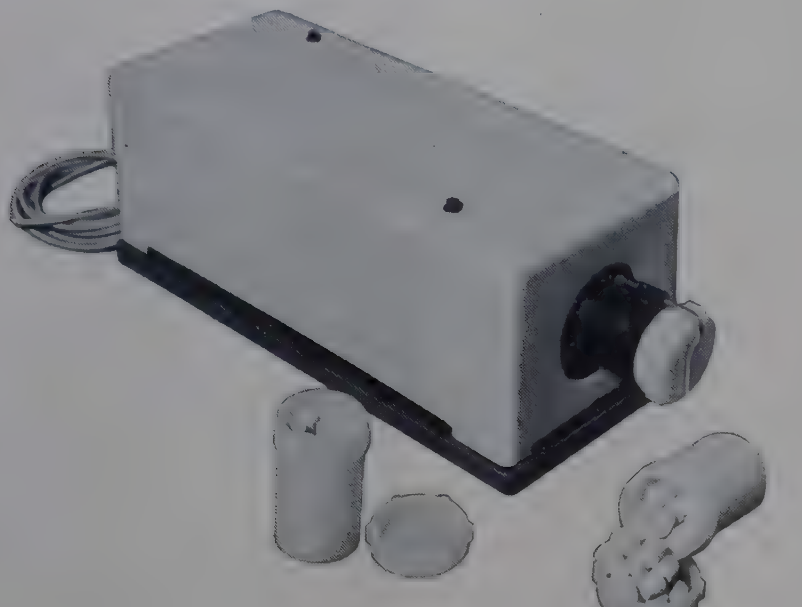
For pot capacity	0·5	1	2·5	5 litres	
Each	£1·00	1·50	3·00	6·00	*fx*

MU-082 **Pourer,** tin plated mild steel, for straining liquid products from ball mill without discharging ball charge.

For pot capacity	0·5	1	2·5	5 litres	
Each	£5·00	6·00	6·00	8·00	*fx*

MU-076
with MU-080

VIBRO-ENERGY MILL


MU-120

MU-120

MILL, micronising, *McCrone*, material charge up to about 10 g. A vibro-energy mill which grinds samples of minerals, glasses, fibres, pigments, etc. down uniformly to 1 μm diameter or even smaller in preparation for analysis by X-ray diffraction, X-ray fluorescence, UV emission or IR absorption techniques. Suitable for dry and slurry grinding. Comprises a 120 ml polypropylene grinding vessel fitted with screw cap closure which is packed with an array of non-porous corundum cylinders to produce both linear contact blows and planar contact shear. Supplied with wood screws for fixing to a firm bench, two polypropylene grinding jars and an extra screw cap for pouring off slurry. For 220/240V 50 Hz supplies. Power rating 70W ... ... Each **£88·50** *fxN*

REPLACEMENT PARTS

MU-124	**Grinding jar,** polypropylene. Without grinding elements	Each	**£2·00**	*fx*
MU-125	**Grinding elements,** corundum.	Set of 48	**£5·00**	*fx*

ACCESSORY

MU-128	**Grinding elements,** agate ...	Set of 48	**£55·00**	*fxN*

LIGHT DUTY MILLS

MU-130

MU-160

MU-130

MILL, light duty, hand operated, for clamping to bench or for wall mounting. Easily regulated for fine or coarse grinding. With grinding disk 9 cm dia. Each **£4·80** *cx*

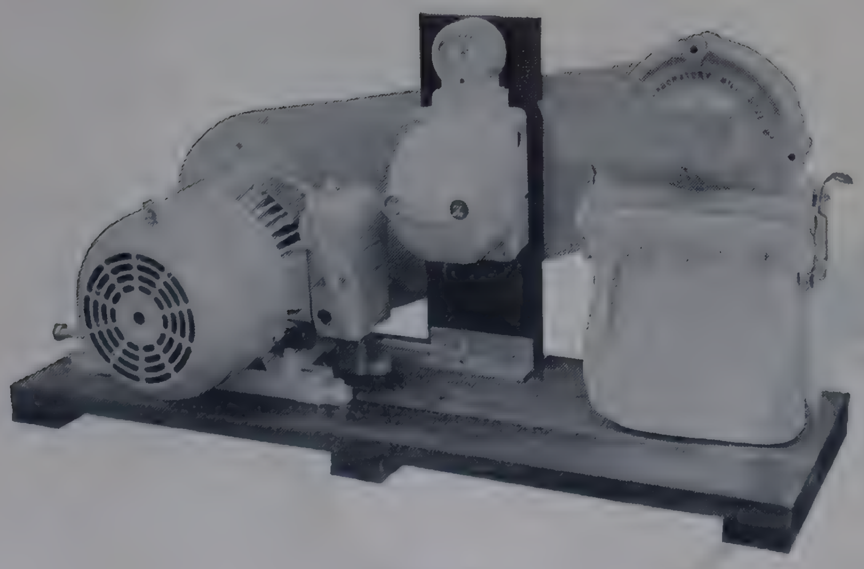
***MU-160**

MILL, light duty, for grinding small quantities of material. With motor, rated for intermittent operation up to 45 sec at a time, mounted in the base and operated by a press button. The upper compartment, closed with a plastics lid, contains a high speed cutter. Capacity approximately 150 ml. For 220/250V 50 Hz supplies ... Each **£3·20** *fx*

HIGH SPEED MILL

The grinding member is a four-armed high grade steel alloy beater-cross which revolves at high speed and shatters or tears sample passed into the feed aperture.

Sample is fed through an aperture 3·8×3·0 cm, and the ground material is collected in a cloth bag which is detachable from the metal frame clipping it to the underside of the mill.


MU-180

MU-180

MILL, *C & N Senior,* **beater-cross,** as specification with 20 cm diameter grinding chamber and vee belt drive giving a beater-cross speed of 8000 rev/min. Complete with capacitor start motor, starter and ammeter mounted on baseplate, feed tray, set of eight steel plate screens with perforations from 0·4 to 2·45 mm, three collecting bags and spare pair of vee drive belts. For 220/240V 50 Hz single phase supplies. ... ... Each **£255·00***mxN*

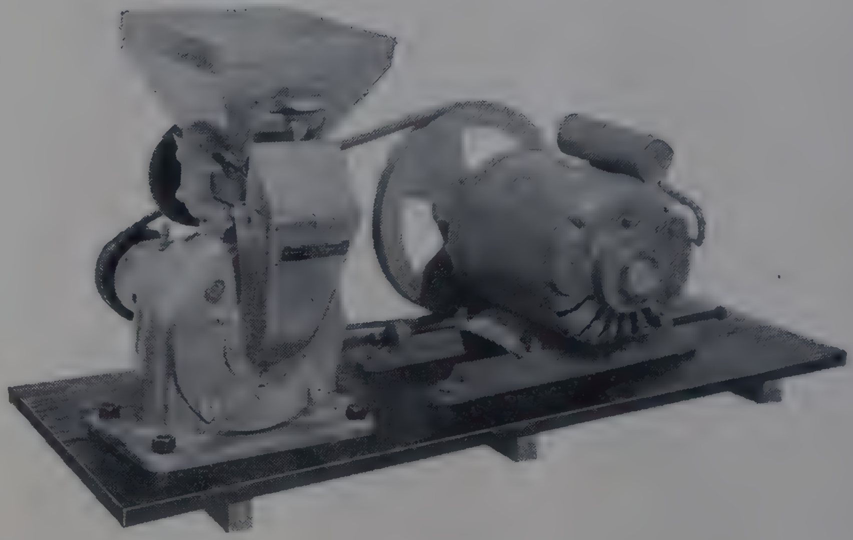
When ordering please state voltage and frequency of supply.

PULMAC MILL

For efficient and economical grinding from feed size less than 6 mm of a wide range of dry materials such as coal, metal ores, foodstuffs, paper, rubber, etc. down to particle sizes ranging from coarse granules to a very fine powder. The mill vibrates very little and can be mounted on bench or stand.

OPERATION

Material is fed from the adjustable feed hopper to the central orifice of the mill. Grinding action is by rotating and stationary crowns of abrasion resisting alloy. The ground material is drawn to the periphery by centrifugal force and ejected at the bottom of the mill. When very fine grinding is required, the final reduction is controlled by a screen placed round the revolving crown. Air induced into the mill by the high speed of the rotor crown aids the effect of the centrifugal force, cools the grinding surfaces, and helps prevent blockage of the screen perforations. The material can be collected in a porous fabric bag, which releases the induced air, whilst keeping back the dust or fine particles. The rapid removal of the rotor crown from the shaft and the stator from the door facilitates cleaning.



MU-282

MU-282

MILL, grinding, *Pulmac*, as specification with $\frac{3}{4}$ hp motor, starter, vee belt drive and steel screen with 0·25 mm diameter perforations. For 220/240V 50 Hz single phase supplies ... ... Each **£150·00** *mxN*

ACCESSORIES

MU-284 **Screens,** steel with 0·25, 0·5, 0·75, 1·0, 1·5 or 2 mm perforations ... ... Each **£1·60** *mxN*

When ordering please state screen size. Screens up to 10 mm perforations available to special order.

When ordering please state voltage and frequency of supply.

END RUNNER MILLS

Mechanically operated pestles and mortars of acid resistant porcelain for dry or wet grinding. A weighted pestle is made to rotate by the friction between it and the rotating mortar. The pestle is free to rise and fall in the mortar, so that the grinding action is one of impact and shear. Both mortar and pestle have spring loaded scrapers, and the pestle may be swung clear of the mortar to facilitate emptying and cleaning. The mortar is fixed to a revolving table which is powered by an electric motor with push-button starter enclosed in the steel base.

Overall dimensions

	H W D
Model 0	46 × 48 × 26 cm
Model 1	120 × 55 × 47 cm

MU-300

MILLS, end runner, grinding, *Pascall*, as specification, with pestle, mortar and plastics dust cover for mortar. For 220/240V a.c. supplies.

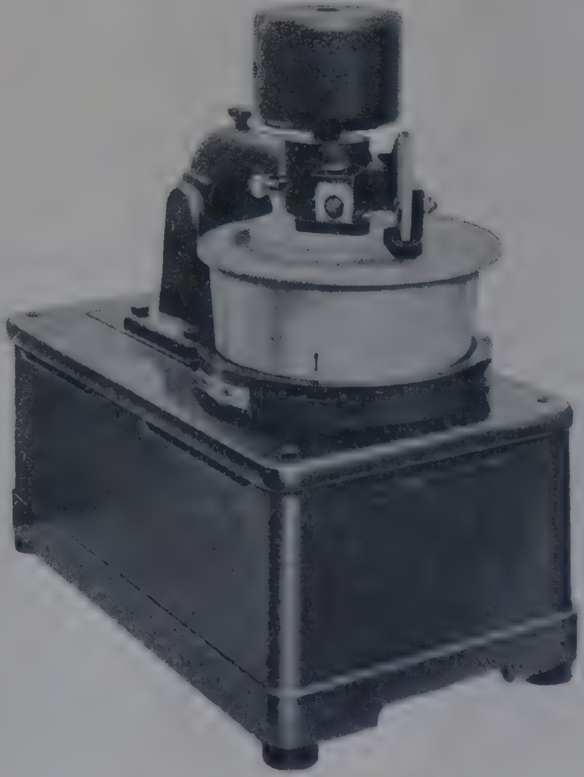
Model No.	0	1	
Mortar dia.	17·5	25 cm	
Capacity approx.	0·25	1 litre	
Each	**£180·00**	**330·00**	*fxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

MU-305 **Pestles and mortars,** acid resisting porcelain.

For Model No.	0	1	
Set	**£29·00**	**53·00**	*fxN*



MU-300 Model No. 0

MU-410

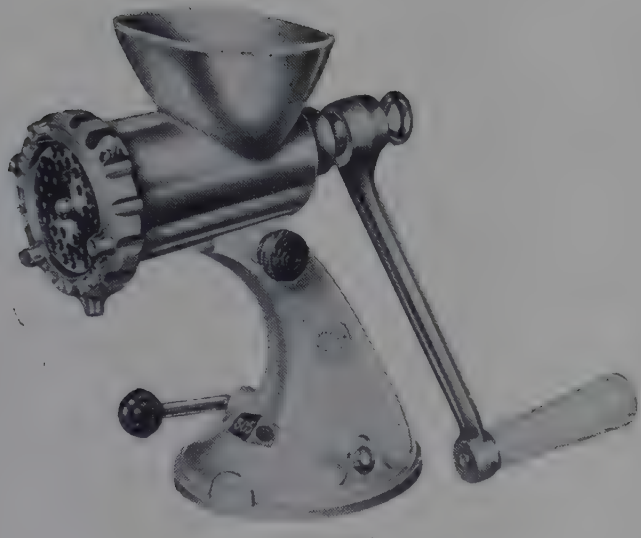
MECHANICAL MORTAR AND PESTLE

Designed to reduce up to approximately 20 g of sample to a fine powder. The aluminium alloy body is stove enamelled and is hinged to provide access to the agate mortar and pestle. Geared motors drive the mortar and pestle independently at 30 rev/min and 90 rev/min respectively in opposite directions. A deflector plate is fitted to assist grinding and a shield is provided to retain sample within the mortar. Mortar capacity approximately 25 ml. Overall dimensions 31 × 55 × 47 cm high. Weight, net 74 kg.

MU-410

MORTAR AND PESTLE, mechanical, *Pascall*, as specification with agate mortar and pestle, deflector and mortar shield. For 200/250V 50 Hz single phase supplies. Each **£255·00** *fxN*

When ordering please state voltage and frequency of supply.



MU-660

MINCER

MU-660

MINCER, bench top mounting, hand operated. The body, worm feed and handle are high quality iron castings tin dipped. With two interchangeable mincer plates having 4·7 and 9·5 mm diameter holes respectively and a hardened steel rotary cutter. Incorporated in the base is a lever operated suction pad which fixes the mixer securely on any smooth surface. Average output, approximately 800 g/min... ... ... Each **£4·50** *cx*

MIXERS, EMULSIFIERS, HOMOGENISERS

MU-902

MIXER, *Kenwood*, for mixing pastes and viscous materials. With interchangeable beaker and whisk rotors and heat resistant glass bowl, capacity 3000 ml. Rotor speed can be controlled in steps up to approximately 200 rev/min. Mounted on hinged stand which has a position for attaching the liquidiser jar MU-914. Power rating 450W. For 200/240V 50 Hz single phase supplies ... Each **£31·30** *fx*

ACCESSORY

MU-914 Glass jar with cutter. For details see entry below.

MU-912

MIXER, *Kenwood*, for blending, grinding, liquefying and disintegrating. Comprises a 1 litre capacity glass jar with clip on plastics lid and base containing a 4-bladed cutter mounted on a power unit fitted with a two-position speed setting switch. For dry grinding maximum running time must not exceed 1 minute. Overall dimensions 21 cm dia. × 47 cm high. Power rating 300W. For 220/240V a.c. single phase supplies ... ... Each **£14·79** *fx*

REPLACEMENT PART

MU-914 Glass jar, complete with base cutter and lid. Each **£5·45** *fx*

MU-902

MU-912

MU-920

MIXER, powder, capacity approx. 3 litres, for mixing trace components and other additives. The detachable thick acrylic container rotates in two planes simultaneously. This movement produces a mix very quickly. The container is fitted with stationary spreaders for breaking up coagulating material. For 220/240V a.c. supplies.
Each **£95·15** *fxN*

REPLACEMENT PART

MU-922 **Container,** acrylic ... ... Each **£11·35** *fxN*

MU-920

MU-942

EMULSIFIER, hand-operated, for emulsification of materials except those containing coarse solid matter or having very high viscosity. When the lever is operated at 90 strokes per minute, 500 ml of material are processed in about 4 minutes. Comprises aluminium bowl and stand, copper alloy cylinder with close fitting piston, and other contact parts of stainless steel. With bench clamp, two different size jets and jet cleaning tool.
Each **£25·20** *mx*

MU-942

MIXER EMULSIFIERS

OPERATION

Materials are subjected to intense mixing and shearing actions and expelled with high velocity into the mix. By correct choice and positioning of the head, smooth mixing free from turbulence and aeration can be achieved.

CONSTRUCTION

All working parts are of stainless steel except the self-lubricating bushes which are normally of phosphor bronze. Heads are quickly interchanged without the use of special tools. A submersible pump head is included with each outfit.

HEADS

Axial flow head, expels material upwards parallel to the rotor shaft. It is recommended for use where mixing free from aeration is required, and is specially suitable for preventing heavy liquids and insoluble solids settling during the mixing process. Normally used with emulsor screen, square hole screen or disintegrator head.

Emulsor screen, used to assist processing and breaking down agglomerates. Can be used with the axial flow head.

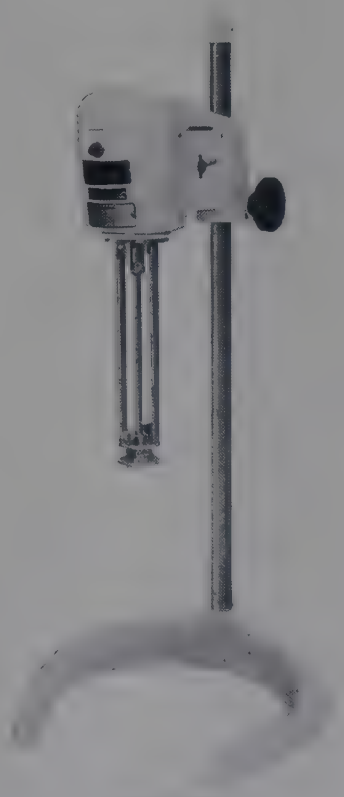
Disintegrator head, used for rapid disintegration and suspension of fibrous materials. Can be used with the axial flow head.

Square hole high shear screen, used for rapid reduction of agglomerates, pigments and tissues, etc. Can be used with axial flow head.

Pump head, a submersible self priming centrifugal pump with an output of up to 18 l/min.

MU-961

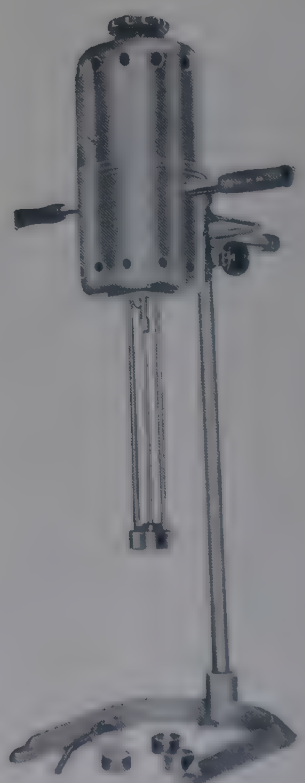
MIXER EMULSIFIER, *Silverson,* **laboratory model,** as specification, with variable speed drive. Suitable for a maximum immersion depth of 20 cm and a minimum opening of 6 cm. Complete with axial flow, disintegrator, screen and pump heads as listed above and bench stand. For 200/240V 50 Hz single phase supplies. Each **£65·00** *fx*



MU-961

MU-965

MIXER EMULSIFIER, *Silverson,* **heavy duty model,** for processing viscous materials. As specification with variable speed drive. Suitable for a maximum immersion depth of 30 cm and a minimum opening of 6 cm. Complete with axial flow, disintegrator, screen and pump heads as listed above and bench stand. For 200/240V 50 Hz single phase supplies ... ... Each **£95·00** *fx*



MU-965

When ordering please state voltage and frequency of supply.

Gallenkamp VACUUM DRYING OVEN

FOR MOISTURE DETERMINATION OR DRYING UNDER VACUUM AT TEMPERATURES UP TO 140°C

- **Robust cast light alloy vacuum chamber**
- **Easy-open door with tubular rubber seal**
- **Built-in thermostat and vacuum gauge**
- **3-way vacuum tap for—evacuation**
  - **—isolation**
  - **—refilling the chamber**

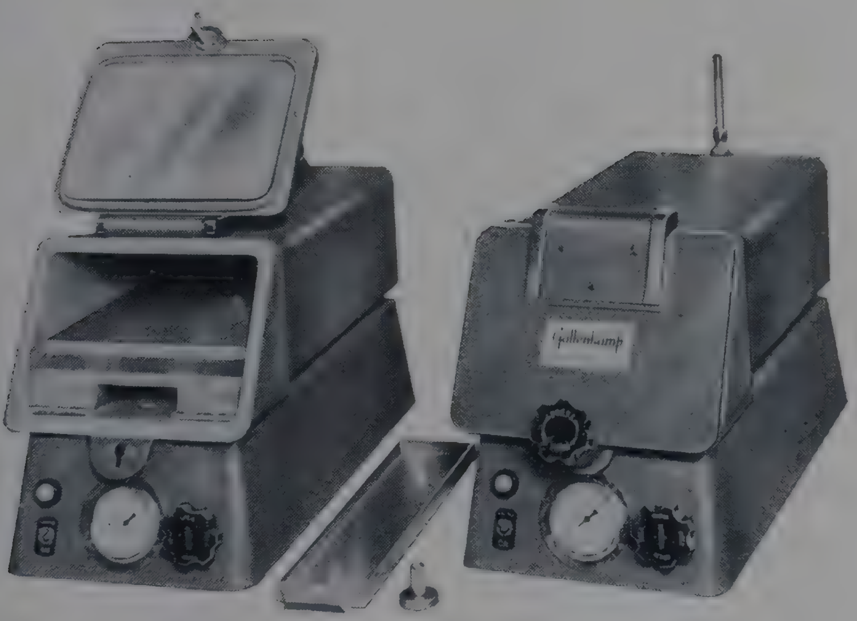
DESIGN

A thermostatically controlled hotplate is mounted on the base of the vacuum chamber. Samples are normally contained in flat metal dishes which make good thermal contact with the hotplate and therefore rapidly reach temperature equilibrium with it. For measurement of hotplate temperature, a pocket is fitted, through which a thermometer may be inserted.

The bimetallic thermostat controls the heater load through a power relay.

PERFORMANCE AND DIMENSIONS

Temperature range	50 to 140°C
Temperature fluctuation	1degC
Temperature variation	±1degC
Power rating max.	200W
Dimensions	H W D
Internal	7 × 20 × 33 cm
External	30 × 25 × 58 cm
Weight, net	20 kg



MV-600

MV-600

VACUUM OVEN, *Gallenkamp*, as specification with cast light alloy vacuum chamber, easy-open door, bimetallic thermostat, power relay, 3-way vacuum tap, vacuum gauge and one each thermometers MV-616 and MV-618. For a.c. single phase or d.c. supplies.

For 220/240V	Each	**£250·00**	*bx*
For 200/210V	Each	**£251·00**	*bxN*
For 110/120V	Each	**£251·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

MV-612 **Heating element,** 200W ... ... Set **£7·50** *bx*

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

MV-614 **Door gasket,** rubber ... ... Each **£0·40** *bx*

MV-616 **Thermometer, oven,** solid stem, range 50 to 110°C subdivided in 1·0degC, with graduations commencing about 120 mm from base of mercury bulb. Overall length about 180 mm, stem diameter 5 to 6 mm.
Ten **£10·80** Each **£1·20** *cx*

MV-618 **Thermometer, oven,** as MV-616 but range 95 to 145°C.
Ten **£15·50** Each **£1·75** *cx*

Gallenkamp SOIL MOISTURE TENSIOMETERS

For the determination of the force which a root must overcome in order to draw water from soil.

Widely used by commercial growers, horticultural and agricultural research stations.

- **Continuous reading of soil moisture tension**
- **Suitable for soil depths between 7·5 cm and 60 cm**

Bench Model

SH-080 Growers model.

SH-085 Bench model.

SH-090 Orchard model.

For details and prices see entries in List No. sequence.

Gallenkamp MOISTURE EXTRACTION OVEN, 250°C

A large capacity modern oven designed for the rapid, even drying of wet bulk laboratory and industrial samples such as sand, vegetable matter, tobacco, wood pulp, paper, etc.

- Accurate temperature control by direct reading *Compenstat* (solid state)
- Safety thermostat for additional protection
- Capacity 210 litres
- Forced ventilation and large heater for rapid moisture extraction
- Liner of corrosion resistant stainless steel to BS 971, EN 58B

For full details and prices see OV-440 and OV-445 in List No. sequence.

Gallenkamp
OVEN

INFRARED MOISTURE TESTER

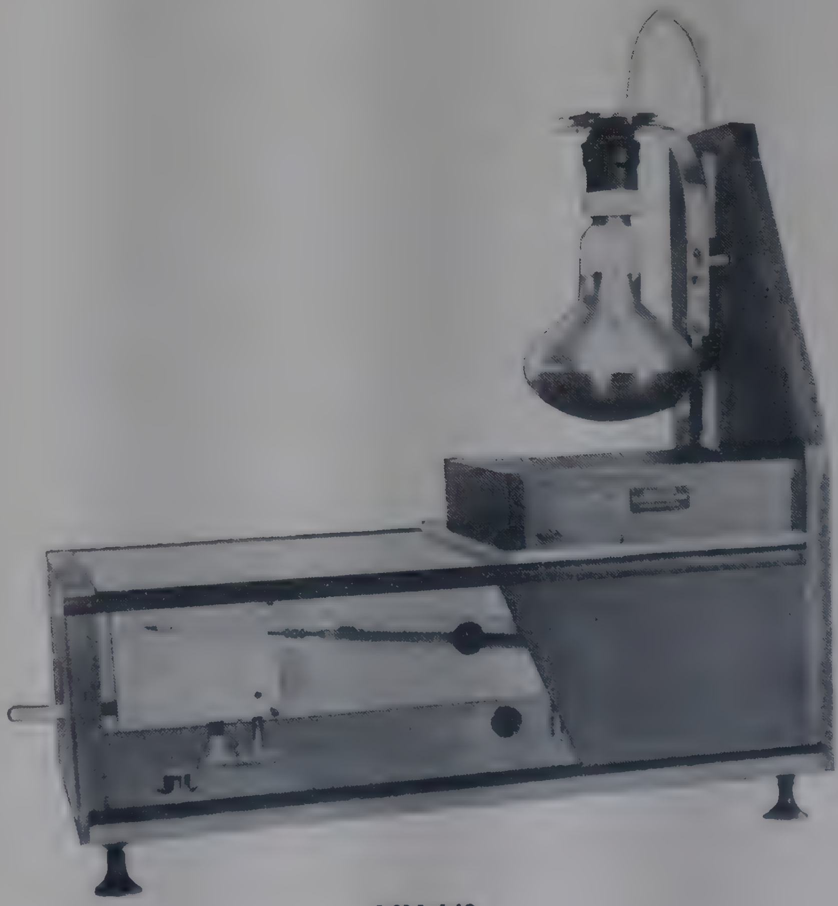
MV-640
MOISTURE BALANCE, infrared, for direct reading moisture loss determinations on many solid and semi-solid materials such as food products, cereals, sand, soil, pharmaceutical products, soap, paper, cosmetics, etc., using approximately 2 g samples. A tare facility of ±10 mg and a zero control allow for small variations in sample weight. The heater is a 150W infrared lamp, the height of which is adjustable against a scale graduated 50 to 137°C. The lamp can be swung aside while the sample is being weighed. The magnetically damped beam balance has a notched, sliding weight bar graduated 5 to 100% in 5% intervals and a fine scale calibrated 0 to 5% in 1% divisions. It is supported by steel knife edges on agate bearings. The balance mechanism is contained within a cabinet with levelling facilities and a glass window to allow the scales to be viewed. The 10 cm dia. removable sample pan is surrounded by a draught shield and beneath it is a glass/asbestos base. Supplied with two interchangeable sample pans. For 220/240V a.c. single phase supplies ... ... Each **£65·00** *fxN*

INFRARED DRYER, *Mettler*, for use with precision top loading balances.
For details and price see BA-948 in List No. sequence.

Other equipment used in the determination of water content.

OV-010 et seq.	Drying ovens.
WJ-130 et seq.	Dean and Stark apparatus.
WJ-450 et seq.	Karl Fischer apparatus.

For full details see entries in List No. sequence.

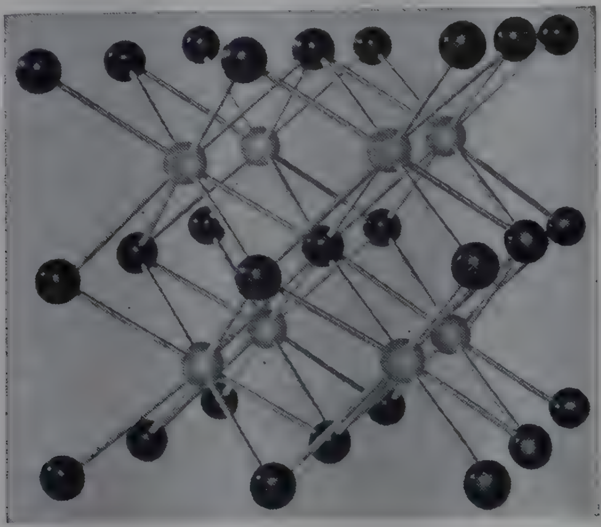


MV-640

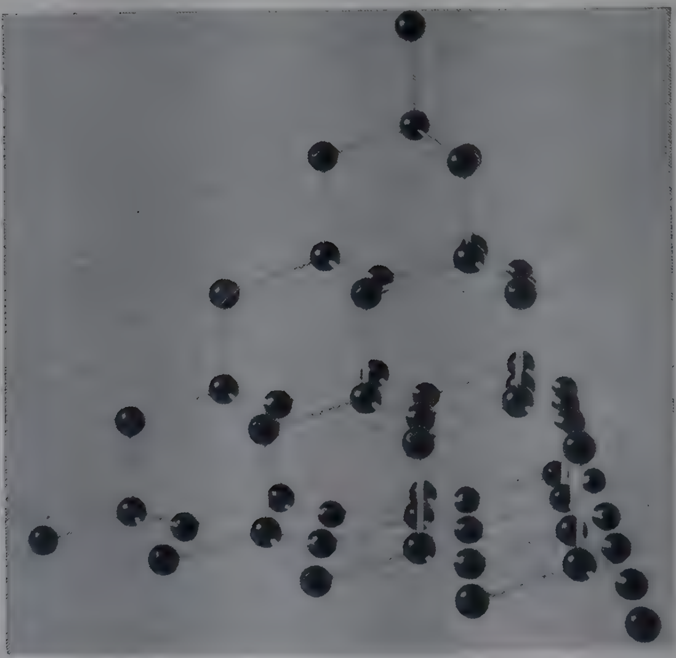
Gallenkamp MOLECULAR MODELS

Originally suggested by Professor W. H. Linnell, D.Sc., Ph.D., F.P.S., F.R.I.C. and repeatedly improved, these models provide a simple means of demonstrating many aspects of molecular and crystal structure.

They are suitable for making models of the molecular, ionic and lattice structures specified in Nuffield Chemistry courses and in many G.C.E. and C.S.E. Chemistry and Physical Sciences syllabuses.



A body-centred cubic lattice for illustrating the arrangement of the crystal axes



Diamond lattice showing tetrahedral arrangement of carbon atoms

MV-800

FOR ORGANIC CHEMISTRY

- to exhibit stereochemical properties
- choice of inter-nuclear distance scales
- valence angles provided by accurate drilling
- for construction of highly strained molecule models.

FOR INORGANIC CHEMISTRY

- for construction of practically any simple inorganic model
- to demonstrate details of configuration
- especially useful for metal co-ordination chemistry
- wide range of symmetries available.

FOR CRYSTALLOGRAPHY

- vivid spatial representation of atoms in lattices
- invaluable for discussion of crystal properties.

The model atoms are moulded polythene spheres drilled to accept the spring bonds. Hole configurations are as follows:

1-hole

2-holes—holes subtend an angle 109° at the centre of the sphere.

4-holes—directed from the centre towards the apices of a regular tetrahedron.

5-holes—directed from the centre towards the apices of a regular trigonal bipyramid.

6-holes—directed from the centre towards the apices of a regular octahedron.

8-holes—directed from the centre towards the corners of a cube.

14-holes—positioned in a unique pattern which enables all common chemical symmetries to be represented.

The connecting springs are close-wound helices of rust resistant steel and are available in four lengths—25 mm, 38 mm, 60 mm and 75 mm. These lengths provide for inter-nuclear distances scaled 0·1 nm = 35 or 48 or 60 mm. Each spring is tapered to fit securely at a controlled depth in all drillings. The assembled models are sufficiently rigid to withstand handling and due to the use of springs for bonding, atomic vibrations can be demonstrated.

CHEMISTRY AND CRYSTALLOGRAPHY SETS

Introductory sets MV-800 and MV-805 include quantities of spheres and springs for trial purposes or individual student use.
The chemistry set enables simple molecules and ions to be made and stereochemical and structural distinctions to be clearly illustrated.
The crystallography set permits the construction of several different lattice types using the 14-hole spheres.

DEMONSTRATION SET

The demonstration set MV-815 is suitable for making numerous models of which the following are examples:

Crystal lattices
Sodium chloride, caesium chloride, calcium fluoride, rutile, zinc blende, diamond, graphite and ice.

Molecules and ions
Phosphorus, sulphur, phosphorus pentoxide, phosphorus pentachloride, phosphate, carbonate, sulphate, nitrate, ammonium and many complex ions.

MV-800

MOLECULAR MODELS, *Gallenkamp*, **chemistry set,** as specification, including instructions leaflet. Comprises the following components packed in a plastics box.

40 white balls	(MV-850)
6 green balls	(MV-854)
6 red balls	(MV-856)
20 black balls	(MV-860)
6 blue balls	(MV-860)
6 yellow balls	(MV-860)
6 black balls	(MV-874)
2 brown balls	(MV-874)
6 yellow balls	(MV-874)
40 springs 25 mm	(MV-840)
40 springs 38 mm	(MV-840)

10 sets **£50·00** Set **£5·50** *bx*

Gallenkamp MOLECULAR MODELS

MV-805

MOLECULAR MODELS, *Gallenkamp*, **crystallographic set,** as specification, including instructions leaflet. Comprises the following components in a plastics box.

36 brown balls (MV-874)
36 orange balls (MV-874)
36 purple balls (MV-874)
150 springs 38 mm (MV-840)
150 springs 60 mm (MV-840)

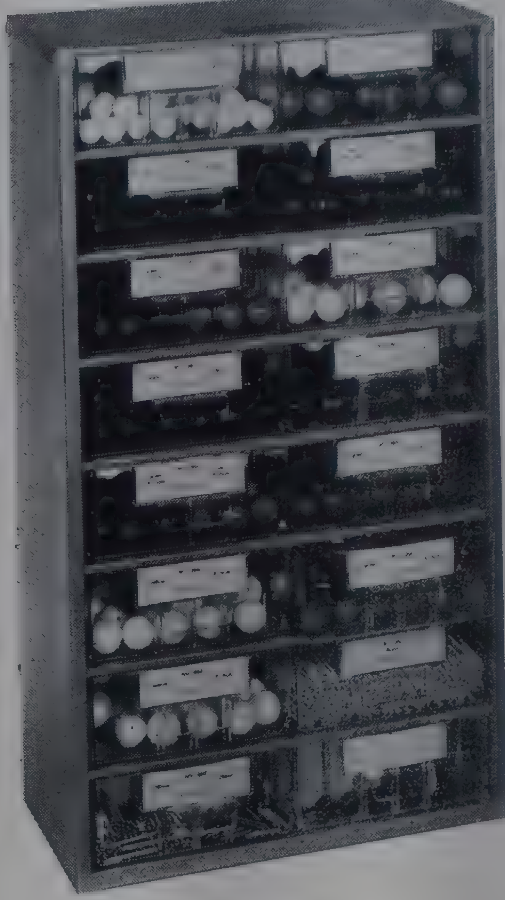
Set **£13·00** *bx*

MV-815

MOLECULAR MODELS, *Gallenkamp*, **demonstration set,** as specification, stored in multi-drawer cabinet with printed labels, and illustrated instructions leaflet. Comprises:

60 white balls (MV-850)
24 white balls (MV-852)
24 red balls (MV-856)
60 black balls (MV-860)
24 brown balls (MV-860)
24 blue balls (MV-860)
24 green balls (MV-860)
24 red balls (MV-860)
24 yellow balls (MV-860)
60 black balls (MV-862)
12 blue balls (MV-862)
12 red balls (MV-862)
12 green balls (MV-862)
48 yellow balls (MV-866)
48 green balls (MV-866)
24 yellow balls (MV-868)
48 green balls (MV-868)
420 springs 60 mm (MV-840)
84 springs 38 mm (MV-840)
12 springs 25 mm (MV-840)
1 organic chemistry stencil SP-960 with instructions booklet.

Set **£41·00** *bx*



MV-815

REPLACEMENT COMPONENTS

BONDS

MV-840 **Spring bonds.** Close wound spiral springs. In packs of 12.

Overall length	25	38	60	75 mm	
10 packs	**£0·80**	**0·95**	**1·30**	**1·65**	*bx*
Pack	**£0·15**	**0·17**	**0·20**	**0·23**	

ATOMS

MV-850 **Model atom, white,** 16 mm dia., **one hole.** In pack of 12.
10 packs **£3·30** Pack **£0·39** *bx*

MV-852 **Model atom,** as MV-850 but with hole right through of clearance diameter of the spring. Represents hydrogen in hydrogen bonding. In pack of 12.
10 packs **£3·80** Pack **£0·44** *bx*

MV-854 **Model atom, green,** 22 mm dia., **one hole.** In pack of 12.
10 packs **£3·30** Pack **£0·39** *bx*

MV-856 **Model atom, red,** 22 mm dia., **two holes.** In pack of 12.
10 packs **£4·50** Pack **£0·50** *bx*

MV-860 **Model atoms,** 22 mm dia., **four hole.** Available coloured **black, blue, brown, green, red or yellow.** In packs of 12 of any one colour.
When ordering please state colour(s) required.
10 packs **£6·00** Pack **£0·66** *bx*

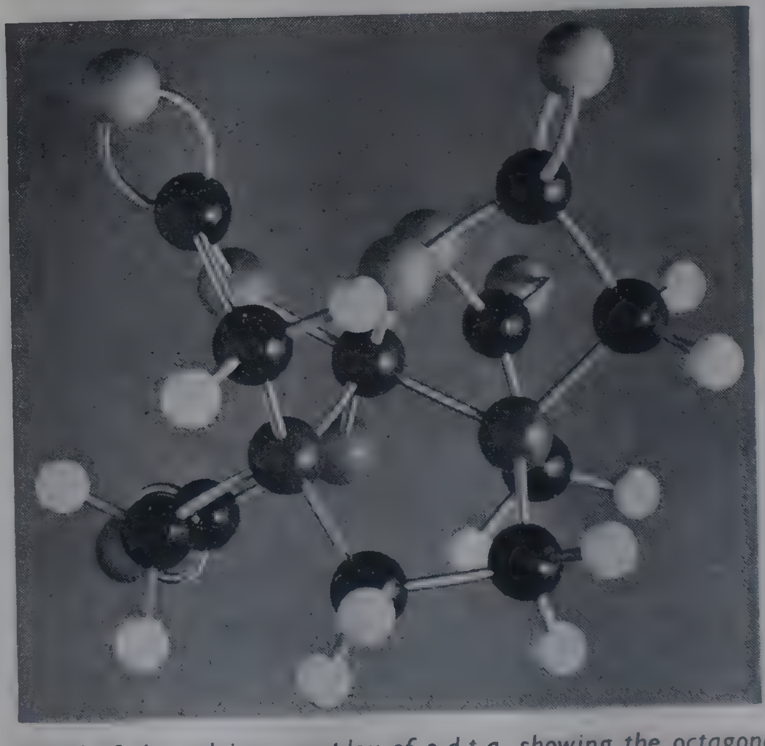
MV-862 **Model atoms,** 22 mm dia., **five hole.** Available coloured **black, blue, green or red.** In packs of 12 of any one colour.
When ordering please state colour(s) required.
10 packs **£6·00** Pack **£0·66** *bx*

MV-866 **Model atoms,** 22 mm dia., **six hole.** Available coloured **green or yellow.** In packs of 12 of any one colour.
When ordering please state colour(s) required.
10 packs **£6·60** Pack **£0·74** *bx*

MV-868 **Model atoms,** 22 mm dia., **eight hole.** Available coloured **green or yellow.** In packs of 12 of any one colour.
When ordering please state colour(s) required.
10 packs **£6·00** Pack **£0·66** *bx*

MV-874 **Model atoms,** 22 mm dia., **fourteen hole.** Available coloured **black, brown, orange, purple or yellow.** In packs of 12 of any one colour.
When ordering please state colour(s) required.
10 packs **£6·60** Pack **£0·74** *bx*

Stencil for drawing representations of models made with these sets see SP-960 in List No. sequence.



Model of the calcium complex of e.d.t.a. showing the octagonal structure of the calcium atom and its occurrence in five 5-membered rings

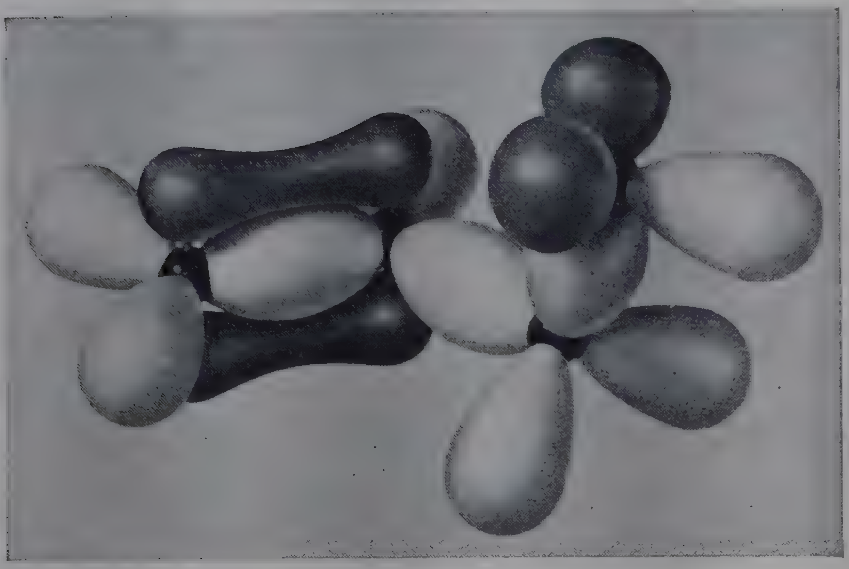
SUGGESTED COLOUR CODE

Black — Carbon
Blue — Nitrogen
Brown — Metals
Green — Halogen
Orange —
Purple —
Red — Oxygen
White — Hydrogen
Yellow — Sulphur or sodium, calcium or caesium in some lattices

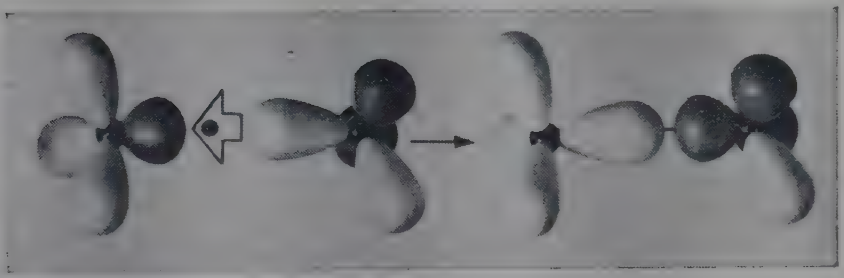
NOTE: The orange and purple balls can be used to represent nuclei in crystal structures, co-ordination compounds, complex ions, etc.

Gallenkamp PEEL* MODELS

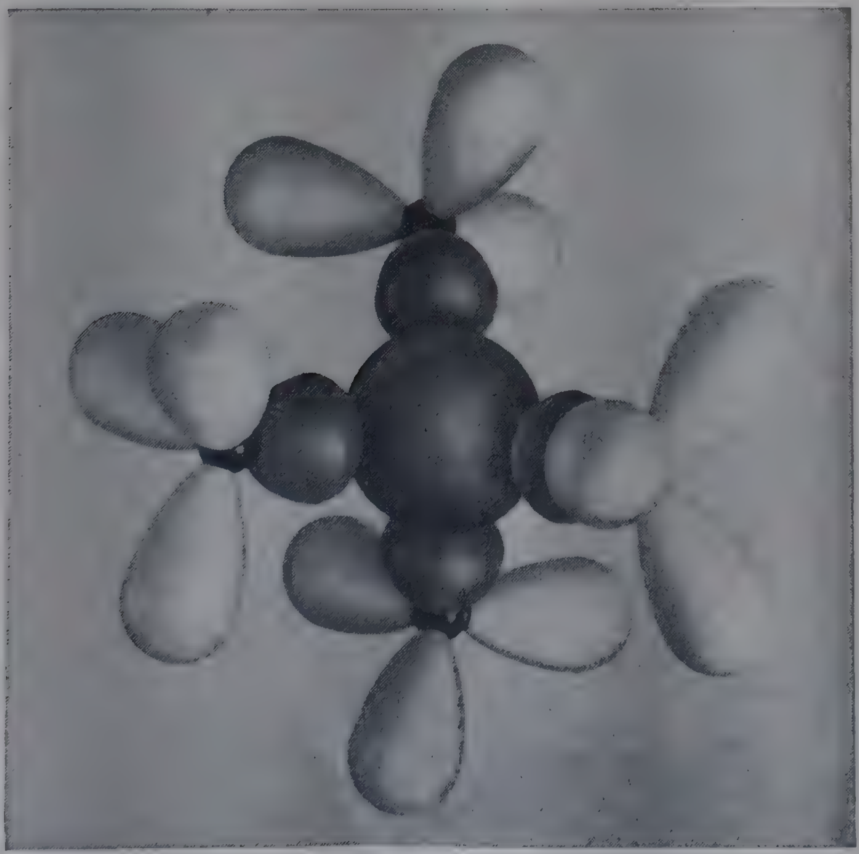
*PROBABILITY ENVELOPES OF ELECTRON LOCATION



Propenol (1:2 Propene, 3 - ol)



$NH_3 + H_2O \rightarrow NH_4^+ + OH^-$
Reaction emphasising the shapes of molecules and proton transfer



The tetrammine zinc II ion

Designed in collaboration with M. B. Ormerod, B.Sc., Dip.Adv.Stud.Ed.(Manc.), F.R.I.C., author of "The Architecture and Properties of Matter; An Approach through Models" published by Edward Arnold (Publishers) Ltd., London.

- **Suitable for teaching courses up to degree level**
- **Dimensionally compatible with *Gallenkamp* Molecular Models**
- **Available in sets and individual components**
- **Instructions manual describes use and applications**

DESCRIPTION

Gallenkamp PEEL Models are moulded expanded polystyrene shapes, in characteristic colours, with sprung-jaw polypropylene inserts to accept close coiled springs which are used also with *Gallenkamp* Molecular Models.

There are four models representing respectively:

Single bond sigma orbitals (white)
Protonated orbitals (white)
Lone pair non-bonding orbitals (red)
Pi orbitals in two and three lobed and hexagonal (aromatic) shapes (green)

These models have a common scale with *Gallenkamp* Molecular Models and provision is made for representing many bond angles in a wide range of symmetries.

APPLICATION

Although the mathematics of the Molecular Orbital Theory is complex and can only be dealt with at degree level, it is possible to explain its results even at CSE and O-level by the use of models. With this approach, the chemistry of species and their shapes may be demonstrated by two concepts:

1. coulombic forces of attraction and repulsion between nuclei and electrons in separate orbits;
2. qualitative variations in effective nuclear charge resulting from shielding effects of orbiting elections.

PEEL models enable these concepts to be understood because "Probability Envelopes of Electron Location" are effectively the shapes in which there is a statistically high probability of bonding or non-bonding electrons occurring.

SETS

Introductory Set demonstrates the structure and reactivity of methane, ammonia, water, carbon dioxide and ethylene.

Benzene Ring Set enables one complete benzene molecular model to be constructed.

General Purpose Set enables over one hundred compounds of C, N, O and F to be built, including benzene, heterocyclic compounds and their substituted derivatives, neutral and charged hydrides, alkanes, alkenes, aliphatic halides, alcohols, ethers, aldehydes, ketones, oximes, carboxylic acids, esters, amides and amines up to C_4. Cells of the diamond, graphite and ice lattices can also be built.

Delocalisation is illustrated by vinyl fluoride, nitroparaffins, ozone, nitrate ion, carboxylic acids and their derivatives and aromatic species.

Structures involving elements in higher periods can be explained by analogy to the elements of the second period.

Gallenkamp PEEL MODELS

REGD TRADE MARK

FOR MOLECULAR ORBITAL EXPLANATIONS OF

- Shapes of molecules
- Bond lengths
- Proton migration in:
  - Interaction of hydrides
  - Electrolysis and ionic migration
  - Precipitation and solution of metal hydroxides
  - Hydrolysis
  - Enolisation
  - Catalytic functions of water
- Relative strengths of acids and bases
- Solvation of ions
- Hydrogen bonding and its relation to:
  - Solubility, volatility, viscosity, anomalous properties of ice and water, clathrates
  - Dimerisation of carboxylic acids
  - Coiling of peptide chains
  - Strength of polyamide fibres
  - Structures of hydrates
- Nature of diamond, graphite and ice lattices
- Complex ion formation
- Pi-bonding, delocalisation and aromatic character
- Organic reaction mechanisms
- Van der Waals forces

In addition to an Instructions Manual, sets are supplied with a stencil to help the student to draw models rapidly and accurately, also with printed cards scaled in molecular dimensions. The models are made to the scale 0·1 nm = 60 mm.
The addition of packs of components, springs and central atoms to the standard sets extends the scope of PEEL models almost indefinitely.

MV-905
PEEL MODELS, *Gallenkamp*, **Introductory Set** as specification, comprising the following components packed in a strong storage carton:

3 sigma orbitals, 0·135 nm	(MV-928)
12 protonated orbitals	(MV-932)
12 lone pair orbitals	(MV-934)
2 pi-orbitals	(MV-940)
With instructions manual	
Spring bonds 12×25 mm 12×38 mm	(MV-840)
Model atoms	
4 black 2 blue	(MV-860)
2 green 2 red	(MV-860)
2 black	(MV-862)
1 scale card	(MV-952)
1 stencil	(MV-950)

10 sets **£36·00** Set **£4·00** *bx*

MV-910
PEEL MODELS, *Gallenkamp*, **Benzene Ring Set.** Comprising the following components packed in a strong storage carton:

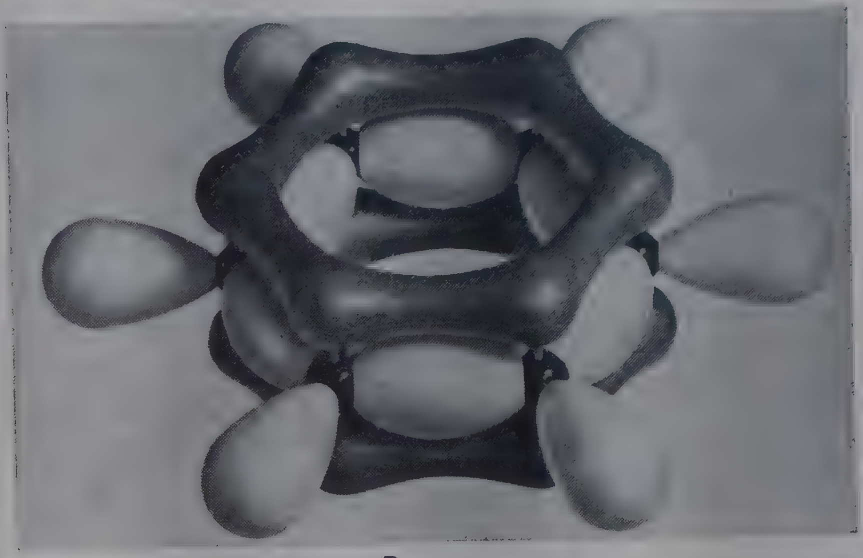
6 sigma orbitals, 0·135 nm	(MV-928)
6 protonated orbitals	(MV-932)
2 benzene pi-orbitals	(MV-936)
1 stencil	(MV-950)
5 scale cards	(MV-952)
6 model atoms, black	(MV-862)
12 springs 25 mm	(MV-840)
24 springs 38 mm	(MV-840)
1 instructions manual	(MV-954)

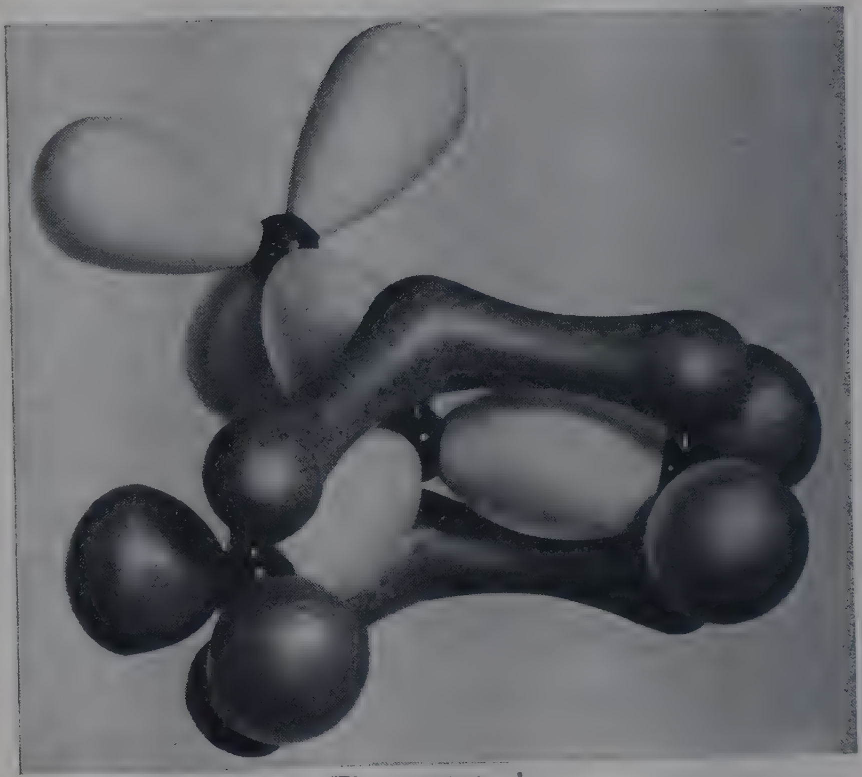
10 sets **£31·00** Set **£3·50** *bx*

MV-915
PEEL MODELS, *Gallenkamp*, **General Purpose Set** as specification, comprising the following components packed in a strong storage carton:

9 sigma orbitals, 0·135 nm	(MV-928)
3 sigma orbitals, 0·15 nm	(MV-930)
18 protonated orbitals	(MV-932)
12 lone pair orbitals	(MV-934)
2 pi-orbitals	(MV-936)
2 pi-orbitals	(MV-940)
2 pi-orbitals	(MV-942)
1 stencil	(MV-950)
5 scale cards	(MV-952)
Spring bonds 24×25 mm 36×36 mm	(MV-840)
Model atoms	
6 black 2 blue	(MV-860)
4 green 2 red	(MV-860)
12 black 2 blue	(MV-862)
4 red 2 green	(MV-862)
1 instructions manual	(MV-954)

10 sets **£68·00** Set **£7·60** *bx*


Benzene


The acetate ion

Bibliography

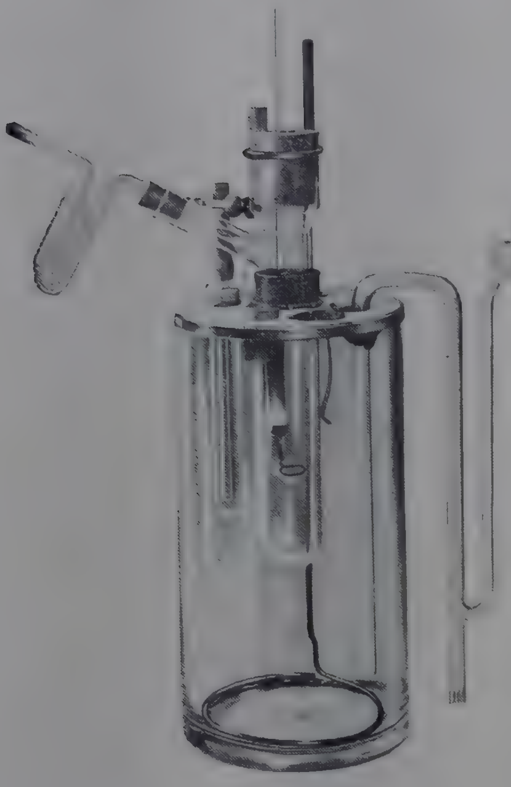
MV-925
TEXT BOOK, 'The Architecture and Properties of Matter; An Approach through Models' by M. B. Ormerod, published by Edward Arnold (Publishers) Ltd., London.
Each **£4·20** *mz*

REPLACEMENT COMPONENTS

MV-928	**Sigma orbital model,** 0·135 nm, white, in pack of 6.	10 packs	**£4·10**	Pack	**£0·46**	bx
MV-930	**Sigma orbital model,** 0·15 nm, white, in pack of 6.	10 packs	**£4·10**	Pack	**£0·46**	bx
MV-932	**Protonated orbital model,** white, in pack of 6.	10 packs	**£3·60**	Pack	**£0·42**	bx
MV-934	**Lone pair (non bonding) orbital model,** red, in pack of 6 ...	10 packs	**£4·20**	Pack	**£0·47**	bx
MV-936	**Benzene delocalised pi-orbital model,** green, in pack of 2 ...	10 packs	**£5·30**	Pack	**£0·59**	bx
MV-940	**Pi-orbital,** two lobed as in ethylene, in pack of 2.	10 packs	**£2·60**	Pack	**£0·32**	bx
MV-942	**Pi-orbital,** three lobed as in acetate ion, in pack of 2.	10 packs	**£2·30**	Pack	**£0·29**	bx
MV-950	**Stencil** for drawing orbital models.	Ten	**£1·90**	Each	**£0·26**	bx
MV-952	**Scale card,** 0 to 3Å, in pack of 5.	10 packs	**£1·50**	Pack	**£0·22**	bx
MV-954	**Instructions manual** ...			Each	**£0·25**	bz
MV-840	**Spring bonds** ...	For full details and prices see entries in List No. sequence.				
MV-860	**Model atoms,** 4 hole ...					
MV-862	**Model atoms,** 5 hole ...					

Regd.

MOLECULAR WEIGHT APPARATUS



MW-020

MW-020

MOLECULAR WEIGHT APPARATUS, (AG), Beckmann freezing point method, described by Findlay[†]. Comprises a stout glass cooling vessel 22·5 cm high and 12·5 cm diameter with a plated metal cover. Through this cover are fitted the various components; air jacket tube containing the freezing tube with side arm, siphon tube and nickel stirrer for the cooling vessel, test tube containing a glass tube for transferring crystals to the freezing tube, and a thermometer. The freezing tube accepts a Beckmann thermometer and stirrer and is fitted with a side arm to which a filling pipette is connected. **Without thermometers** ... Each **£14·75** *bx*

REPLACEMENT PARTS

JE-100	**Cooling vessel,** 22·5×12·5 cm. See entry in List No. sequence.			
MW-024	**Freezing tube,** with side arm	Each	**£0·90**	*ax*
MW-026	**Air jacket tube**	Each	**£0·35**	*ax*

ACCESSORIES

TJ-174	**Thermometer,** for cooling vessel, B.60C/100	For prices see entries in List No. sequence.
TJ-521	**Thermometer, Beckmann,** with top zero	

MW-050

MOLECULAR WEIGHT APPARATUS, (AG), Landsberger boiling point method. Comprises 150 ml conical flask connected to a glass tube graduated 5 to 35 cm^3 in 1 cm^3, with outer glass jacket. With bends and centre spray tube. **Without thermometer.** Each **£4·90** *ax*

REPLACEMENT PARTS

MW-052	**Inner tube,** graduated 5 to 35 cm^3 ...	Each	**£1·15**	*ax*
MW-054	**Outer jacket**	Each	**£0·75**	*ax*
FJ-050	**Flask,** conical, 150 ml. For price see entry in List No. sequence.			

ACCESSORIES

CU-320	**Condenser, Liebig,** 25 cm, for connection to vapour outlet	For details and prices see entries in List No. sequence.
TJ-070	**Thermometer,** total immersion, range −5 to 105°C subdivided in 0·1degC ...	
TJ-523	**Thermometer, Beckmann,** with bottom zero	

MW-090

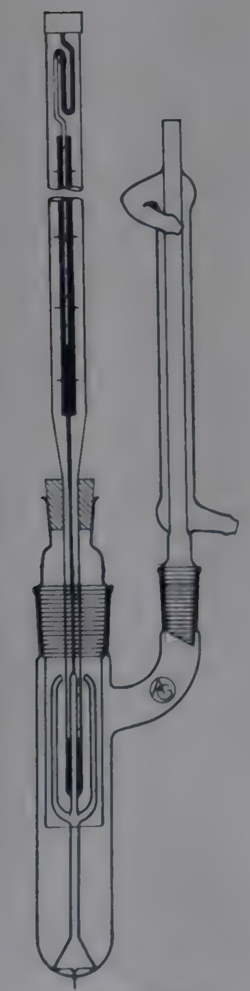
MOLECULAR WEIGHT APPARATUS, (AG), Washburn and Read boiling point method, with the Cottrell pump, as described by Findlay[†]. Comprises a boiling tube with a short tungsten wire sealed into the base to give steady heating, a 29/32 socket and a side arm with a 14/23 socket. A thermometer adapter with a cylindrical extension to shield the bulb fits into the main socket while a Liebig condenser fits into the side arm socket. The Cottrell pump rests inside the boiling tube and has three branches terminating above the bulb. **Without Beckmann thermometer**... Each **£3·90** *ax*

REPLACEMENT PARTS

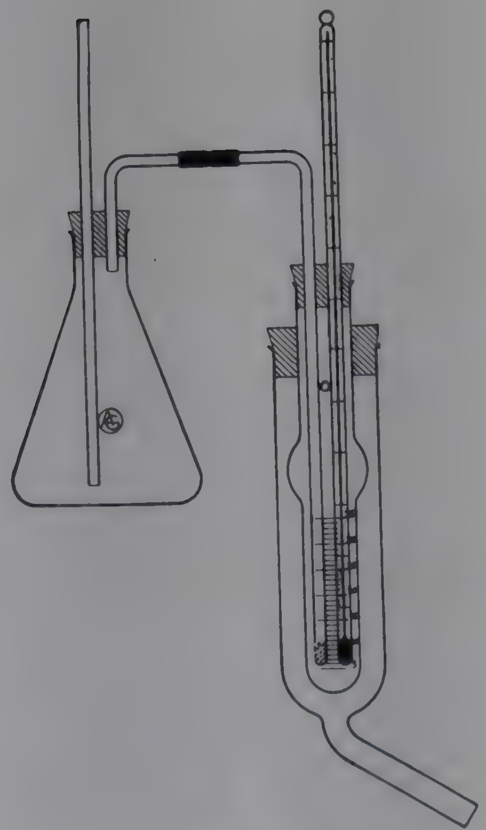
MW-092	**Boiling tube,** with 29/32 and 14/23 sockets.	Each	**£1·25**	*ax*
MW-094	**Thermometer adapter,** with 29/32 cone.	Each	**£0·75**	*ax*
MW-096	**Cottrell pump**	Each	**£1·05**	*ax*
MW-098	**Condenser, Liebig,** 20 cm, with 14/23 cone.	Each	**£1·05**	*ax*

ACCESSORY

TJ-523	**Thermometer, Beckmann,** with bottom zero. For details and price see entry in List No. sequence.



MW-090
with thermometer



MW-050
with thermometer

TABLET PRESS for use with above apparatus see PU-210 in List No. sequence.

[†] Findlay 'Practical Physical Chemistry' 1954.

Gallenkamp HEITLER SEMI-MICRO EBULLIOMETER

- Molecular weight determinations of organic solids and liquids by boiling point elevation method
- Reaction kinetics studies using potentiometric recorder
- Polymerisation and saponification studies

PERFORMANCE AND OPERATION

Rapidly measures elevations of not less than 0·0005degC in the boiling points of organic solvents on the addition of the solutes. With chemical systems behaving normally, molecular weights of up to 500 may be determined to within 1%. For higher molecular weights, solution concentrations are smaller and the solvent must be stabilised. Molecular weights of 500 to 1000 may be determined to within 2%. Where known standards at comparable molecular weight and composition are available, molecular weights of 1000 to 5000 may be determined to about 3%.

CONSTRUCTION AND DIMENSIONS

A complete ebulliometer outfit comprises either one or two borosilicate glass ebulliometer vessels in heating stands, a thermistor bridge and a galvanometer, with connecting leads.

Vessel and heating stand

The vessel is a modified Cottrell pump with a tungsten wire fused into the base to conduct heat to the solution. Efficient boiling produces rapid circulation of an intimate foam of solution and vapour thus providing conditions under which the boiling point is precisely measured. Boiling temperature is sensed by a thermistor probe in the foam. The vapour condenses on a 'cold finger', and condensate returns steadily to the boiler. In this way a state of dynamic equilibrium is attained.
The stand comprises a base with heating element and control, surmounted by a plastics draught shield.

Thermistor bridge and galvanometer

The four decade bridge can either be connected to two vessels, one for measuring boiling point, the other compensating for changes in ambient pressure, or for less accurate work to the measuring vessel only. Resistance is measured to within 0·1Ω. The galvanometer is a taut suspension type with a 6-position sensitivity control; coil resistance 1400 ohms; maximum sensitivity 180 mm/μA. For reaction kinetics studies the galvanometer can be replaced by a potentiometric recorder of sensitivity 2·5 mV and chart speed 60 cm/hr to 60 cm/day depending on reaction rate.

Dimensions and weights	H W D	Net wt.
Vessel and heating stand	36×18×17 cm	2·6 kg
Thermistor bridge	15×28×27 cm	3·5 kg
Galvanometer	16×19×28 cm	2·6 kg

BIBLIOGRAPHY

1. Heitler, C., Chem. & Ind. 1952, 875. A paper on original kinetic study work.
2. Heitler, C., Analyst 1958, 83, 223-229. The original paper describing the ebulliometer.
3. Heitler, C., J. Chem. Soc., 1963 4885-4889. An ebulliometric study of the kinetics of the Knoevenagel reaction.
4. Heitler, C., Talanta 11, 1081-1085. An ebulliometric study of the kinetics of the ethanolysis of ester groups.
5. Heitler, C., Talanta 1964, 11, 1471-1487. The most detailed survey of the sources of error in ebulliometric work, giving a clear account of the effects of stabilisers and describing methods of correction of results.

Gallenkamp

THERMISTOR BRIDGE
Gallenkamp

MW-140

MW-140
SEMI-MICRO EBULLIOMETER, *Gallenkamp*, **Heitler,** outfit comprising **one** vessel and heating stand, thermistor bridge with battery, galvanometer and instructions manual. For a.c. single phase supplies.

For 220/240V	Each	**£246·00**	*gx*
For 200/210V	Each	**£247·00**	*gxN*
For 110/120V	Each	**£247·00**	*gxN*

MW-145
SEMI-MICRO EBULLIOMETER, *Gallenkamp*, **Heitler,** outfit as MW-140 but includes **two** vessels and heating stands (one for measuring and the other for compensating). For a.c. single phase supplies.

For 220/240V	Each	**£298·00**	*gx*
For 200/210V	Each	**£299·00**	*gxN*
For 110/120V	Each	**£299·00**	*gxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

MW-152	**Ebulliometer vessel**	Each	**£4·60**	*ax*
MW-154	**'Cold finger' condenser**	Each	**£1·40**	*ax*
MW-156	**Thermistor element** pre-aged, in ptfe cone. For use in MW-140	Each	**£8·00**	*bx*
MW-158	**Thermistor elements,** matched pair of MW-156. For use in MW-145	Pair	**£16·50**	*bx*
MW-160	**Battery,** 9V *Ever-Ready* type PP11 ...	Each	**£0·42**	*fx*
MF-380	**Heating element,** for heating block (two required). For price see entry in List No. sequence.			

ACCESSORIES

EF-680	**Recorder,** *Smiths* ...	For details and prices see entries in List No. sequence.
PU-210	**Tablet press** ...	

MORTARS AND PESTLES

MW-730
MW-735

MW-730

MORTARS AND PESTLES, vitreous porcelain, unglazed. Pestles have wooden handles.

Outside dia.	8	9	11	13 cm	
Capacity approx.	60	115	200	280 ml	
Ten	**£10·00**	**11·40**	**13·80**	**15·00**	cx
Each	**£ 1·12**	**1·30**	**1·55**	**1·70**	

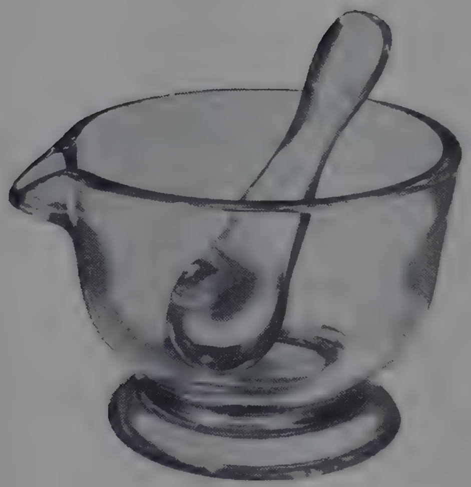
Outside dia.	16·5	20	25	30·5 cm	
Capacity approx.	570	1100	2300	4500 ml	
Ten	**£20·50**	**29·00**	**42·00**	—	cx
Each	**£ 2·30**	**3·20**	**4·70**	**8·00**	

MW-735

MORTARS AND PESTLES, vitreous porcelain, completely glazed. Pestles have wooden handles.

Outside dia.	8	9	11	13 cm	
Capacity approx.	60	115	200	280 ml	
Ten	**£13·80**	**16·00**	**19·50**	**21·00**	cx
Each	**£ 1·55**	**1·80**	**2·20**	**2·35**	

Outside dia.	16·5	20	25	30·5 cm	
Capacity approx.	570	1100	2300	4500 ml	
Ten	**£28·50**	**41·00**	**58·00**	—	cx
Each	**£ 3·20**	**4·60**	**6·20**	**11·00**	

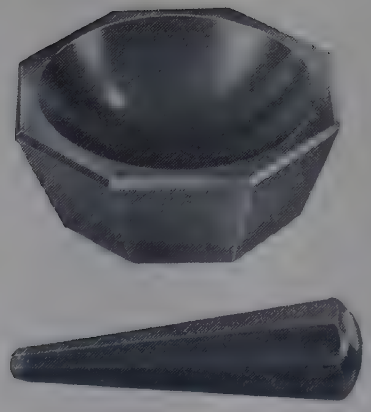


MW-770

MW-770

MORTARS AND PESTLES, glass.

Outside dia.	5	8	11	15	20 cm	
Capacity approx.	30	80	230	850	1500 ml	
Ten	**£7·20**	**8·20**	**10·20**	**14·60**	**23·50**	cx
Each	**£0·80**	**0·92**	**1·14**	**1·65**	**2·60**	



MW-820

***MW-820**

MORTARS AND PESTLES, agate, highly polished. The natural stone is cut so that working area is as free as possible from blemishes.

Dia. external	40	57	70	85	100 mm	
Dia. internal	34	51	60	76	87 mm	
Each	**£6·50**	**8·80**	**10·50**	**17·00**	**25·00**	cx

MECHANICAL MORTARS AND PESTLES

see MU-300 and MU-410 in List No. sequence.

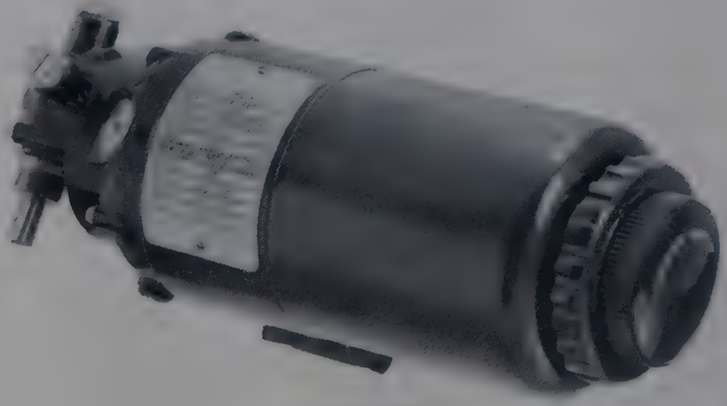
VARIABLE SPEED MOTORS

MX-550

MOTORS, series wound, geared. A fan cooled motor in frame with integral ON/OFF switch and speed controlling potentiometer. Output shaft, diameter $\frac{5}{16}$ in, adjustable to any of twelve positions set at 30° to each other. Overall dimensions 23×9×9 cm. For 200/250V a.c. supplies only.

On-load speed range approx.		
Rev/min min.	5	2
Rev/min max.	25	10
Torque kgf cm	4·7	4·7
Both ranges	Each	**£26·50** *mxN*

When ordering please specify voltage and frequency of supply and speed range required.



MX-550

UNIVERSAL MOTORS

TO BS 170

With stove enamelled frames, sealed bearings and enclosed cooling fans. Rotation is counterclockwise and speeds quoted are approximate for a.c. operation. **These are not constant speed motors.** The speeds achieved in operation are dependent on the loads applied.

MX-602

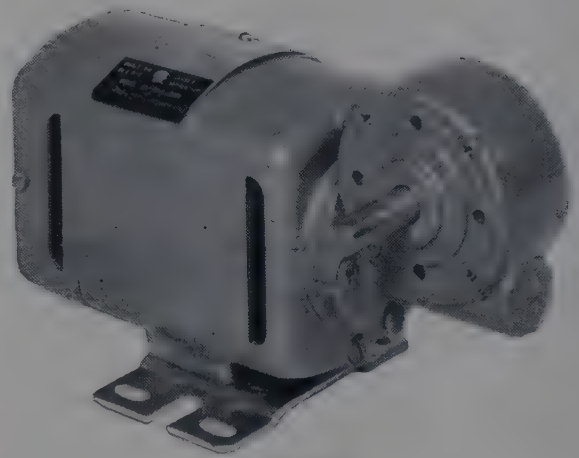
MOTORS, universal, series wound, as specification. Overall dimensions 16×9×9 cm high. Output shaft diameter $\frac{5}{16}$ in. For 220/240V a.c. single phase or d.c. supplies.

Rev/min, no load	8000	11000	13000
Rev/min, full load	2500	4000	6500
All ranges		Each	**£15·60** *cxN*

MX-606

MOTORS, universal, series wound, as specification, with single reduction gear. Overall dimensions 18×9×11 cm high. Output shaft diameter $\frac{3}{8}$ in. For 220/240V a.c. single phase or d.c. supplies.

Rev/min, full load	50	100	200	500
Full load torque kgf cm	25	17	12	5
All ranges			Each	**£24·00** *cxN*



MX-606

MX-610

MOTORS, universal, series wound, as specification, with double reduction gear. Overall dimensions 20×11×13 cm high. Output shaft diameter $\frac{3}{8}$ in. For 220/240V a.c. single phase or d.c. supplies.

Rev/min, full load	5	10
Full load torque kgf cm	40	40
Both ranges	Each	**£31·50** *cxN*

When ordering universal motors please specify speed range required.

ACCESSORIES

MX-720 **Pulleys,** aluminium, with two V grooves. To fit $\frac{5}{16}$ in diameter shafts.

Size No.	1	2	
Diameter of V grooves	1 and 1½	1½ and 2⅜ in	
Each	**£1·00**	**1·00**	cx

MX-721 **Pulleys** as MX-720, but to fit $\frac{3}{8}$ in diameter shafts.

Size No.	1	2	
Diameter of V grooves	1 and 1½	1½ and 2⅜ in	
Each	**£0·75**	**1·00**	cx

MX-760 **Belting, nylon braided** diameter 3 mm. Comprises rubber core covered with nylon braiding impregnated with synthetic rubber.

Circumference, unextended	51	56 cm	
Each	**£0·40**	**0·45**	cx

Gallenkamp
REGD. TRADE MARK

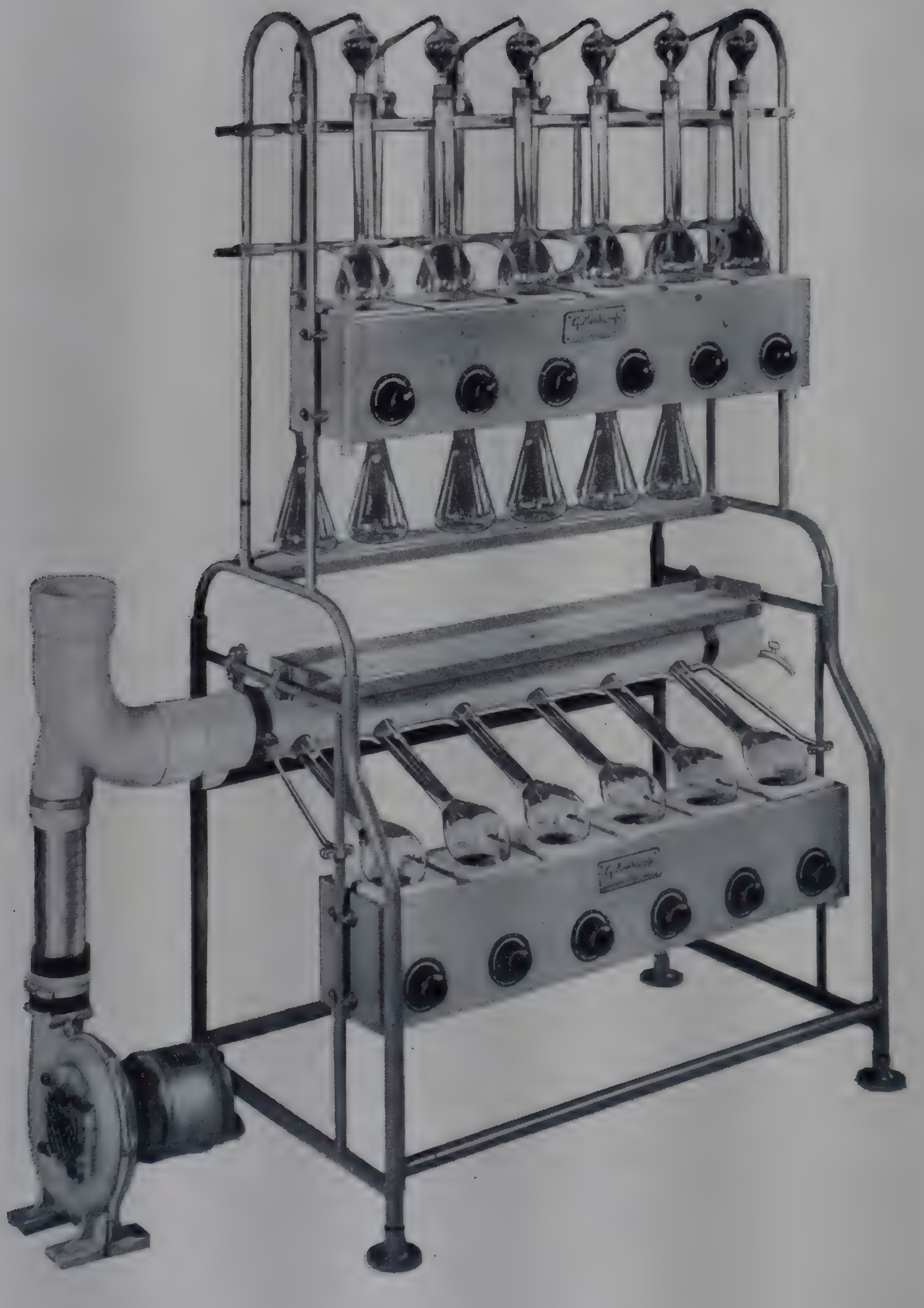
SHAKERS AND STIRRERS

Bottle shaker	see SD-250
Flask shakers	see SD-110 and SD-125
Handilab stirrer	see SS-425
Variable speed stirrers	see SS-510 and SS-540
Magnetic stirrers	see SS-590 to SS-690

For details and prices see entries in List No. sequence.

Gallenkamp KJELDAHL EQUIPMENT

REGD TRADE MARK



Typical arrangement of *Gallenkamp* Kjeldahl equipment arranged for electric heating and permitting simultaneous digestion of 6 samples and distillation of 6 further samples.

This range of equipment for determination of nitrogen by the Kjeldahl method comprises a versatile series of interchangeable components which can be assembled in many ways to meet individual requirements. The units are based on a bank of 6 tests and can be extended in multiples of 6 as required.

HEATERS

Alternatives are available, all of which can be used for digestion or distillation.

NR-080	Electric with individual energy regulator controls, suitable for flasks 300 to 1000 ml.
NR-090 and NR-091	Gas with individual tap controls, suitable for flasks 300 to 800 ml.
NR-100	Electric heating mantles with individual energy regulator controls, suitable for flasks 100 to 500 ml.

STANDS

For **digestion** purposes three alternatives are available.

The simplest, for use in a fume cupboard, comprises flask rest NR-022 on support rods NR-094 mounted on the ends of a heater unit.

For open bench use the above can be supplied together with vapour tube stand NR-010—see NP-900 on next page.

For permanent installations NR-020 is recommended. For **distillation** purposes NR-030 is used—see NP-910 on next page. This may be stood on a bench or mounted on top of the digestion stand NR-020 for combined digestion and distillation—see NP-920 on next page.

CONDENSERS

These may be individually jacketed Liebig condensers or a single cooling tank may be used. In either case the inner tubes may be of glass or monel metal with ends bent to suit upward or downward sloping stillheads. When individual condensers are used rack NR-036 provides support combined with water inlet and outlet manifolds.

FUME EXTRACTION

A comprehensive range of components fabricated in rigid PVC enables the assembly of an ejector extraction system to suit any location.

Gallenkamp KJELDAHL EQUIPMENT

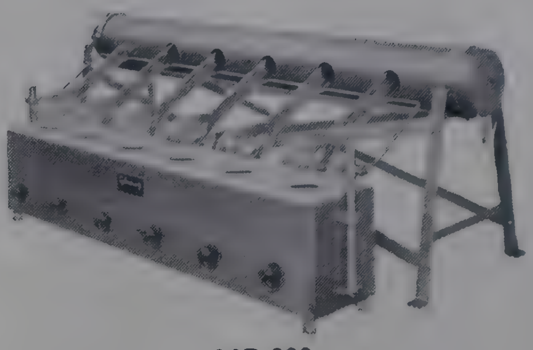
NP-900

KJELDAHL DIGESTION ASSEMBLY, *Gallenkamp*, comprising:

NR-080	1 × Heater unit for 500 ml Kjeldahl flasks.
NR-094	2 × Support rods.
NR-022	1 × Flask rest.
NR-010	1 × Vapour tube bench stand.
NR-120	1 × Vapour tube.
NR-124	1 × End cap.
NR-174	Welding solution.
FJ-160	6 × Kjeldahl flasks, capacity 500 ml.

For 220/240V a.c. single phase supplies.	Each **£126·00**	*gx*
For 200/210V a.c. single phase supplies.	Each **£128·00**	*gxN*
For 110/120V a.c. single phase supplies.	Each **£128·00**	*gxN*

NOTE: NR-120 terminates in a socket to fit trunking NR-160 et seq.



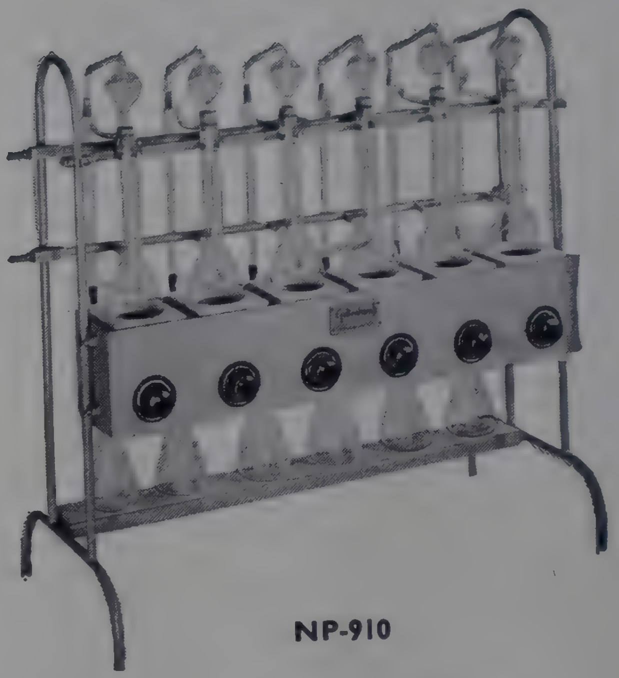
NP-900

NP-910

KJELDAHL DISTILLATION ASSEMBLY, *Gallenkamp*, comprising:

NR-080	1 × Heater unit for 500 ml Kjeldahl flasks.
NR-030	1 × Distillation stand.
NR-032	1 × Flask holder for 500 ml Kjeldahl flasks.
NR-036	1 × Condenser rack.
FJ-160	6 × Kjeldahl flasks, capacity 500 ml.
NR-215	6 × Rubber stoppers, size No. 29, drilled 10 mm hole.
NR-200	6 × Splash heads.
NR-210	6 × Condensers.
TX-750	1 metre Tubing to connect NR-200 to NR-210, Size N8.
NR-224	6 × Safety bulbs.
FJ-050	6 × Conical flasks, capacity 500 ml.

For 220/240V a.c. single phase supplies.	Each **£167·50**	*gx*
For 200/210V a.c. single phase supplies.	Each **£169·50**	*gxN*
For 110/120V a.c. single phase supplies.	Each **£169·50**	*gxN*



NP-910

NP-920

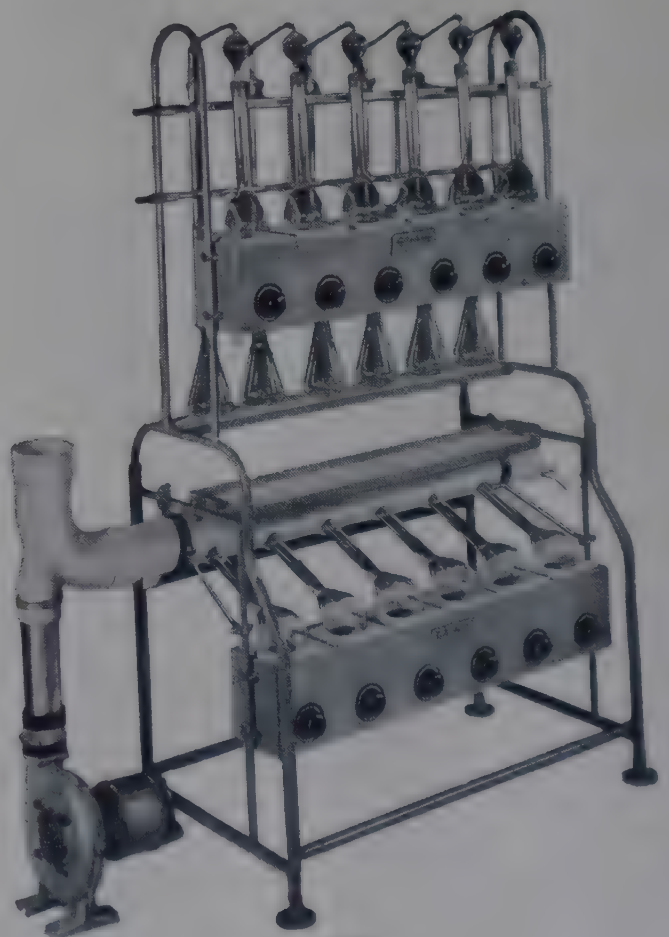
KJELDAHL DIGESTION AND DISTILLATION ASSEMBLY, *Gallenkamp*, comprising:

NR-080	2 × Heater units for 500 ml Kjeldahl flasks.
NR-020	1 × Floor stand.
NR-022	1 × Flask rest.
NR-030	1 × Distillation stand.
NR-032	1 × Flask holder for 500 ml Kjeldahl flasks.
NR-036	1 × Condenser rack.
FJ-160	12 × Kjeldahl flasks, capacity 500 ml.
NR-215	6 × Rubber stoppers, size No. 29, drilled 10 mm hole.
NR-200	6 × Splash heads.
NR-210	6 × Condensers.
TX-750	1 metre Tubing to connect NR-200 to NR-210, Size N8.
NR-224	6 × Safety bulbs.
FJ-050	6 × Conical flasks, capacity 500 ml.
NR-120	1 × Vapour tube.
NR-124	1 × End cap.
NR-132	1 × Ejector unit.
NR-174	Welding solution for joining above three items.
NR-140	1 × Fan.
NR-144	45 cm Flexible metallic tubing.
NR-146	1 × Connecting sleeve.
NR-148	2 × Hose clips.

For 220/240V a.c. single phase supplies.	Each **£409·50**	*gx*
For 200/210V a.c. single phase supplies.	Each **£413·50**	*gxN*

NOTE: The fan and fume ejector unit is suitable for an ejection path of up to 600 cm either straight or with one bend. The ejector unit terminates in a socket to fit trunking NR-160 et seq.

When ordering Kjeldahl Assemblies please specify voltage and frequency of supply.

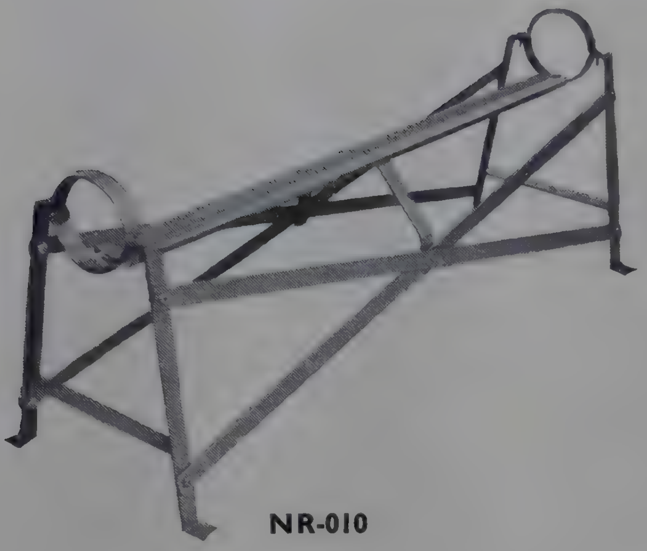


NP-920

Gallenkamp KJELDAHL EQUIPMENT

REGD TRADE MARK

STANDS AND FITTINGS

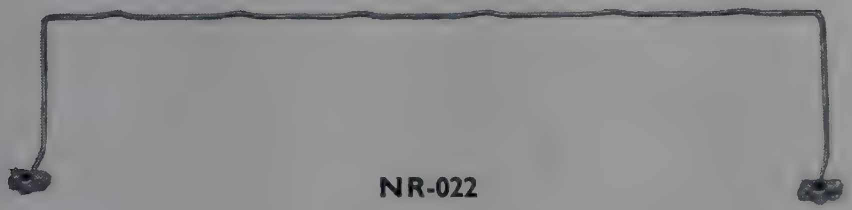


NR-010

NR-010
BENCH STAND, for mounting vapour tube NR-120 at a centre distance of about 40 cm above the bench top. Made from rust-proofed steel finished in stoved grey enamel ... ... Each **£17·00** *bx*

NR-020
FLOOR STAND, for *Gallenkamp* 6-test digestion unit and for supporting distillation assemblies mounted on stand NR-030. Tubular steel construction finished in stoved grey enamel, with rubber lined shelf to support the receiving flasks. Overall dimensions 100 × 60 × 77 cm high ... ... Each **£57·00** *bx*

For illustration of NR-020 and NR-030 see assembly illustration for NP-920 on previous page.



NR-022

NR-022
FLASK REST, for use with heaters NR-080, NR-090, NR-091 and NR-100 to form a digestion unit which may be used in a fume cupboard. Made from stainless steel crimped to support flask necks and fitted with clamps to fit stand NR-020 or support rods NR-094.
Each **£6·50** *bx*

NR-030
DISTILLATION STAND, for *Gallenkamp* Kjeldahl distillation unit, constructed of strong tubular steel to take heaters NR-080, NR-090, NR-091 and NR-100, flask holder NR-032, condenser rack NR-036 and condenser tank NR-040. A rubber lined shelf is fitted to take 500 ml conical receiving flasks. The flasks may be lowered at the end of the distillation process for draining the condenser tubes. The stand is rust-proofed and finished in stoved grey enamel. Overall dimensions 97 × 43 × 107 cm high.
Each **£20·00** *bx*

NR-032
FLASK HOLDER, for *Gallenkamp* Kjeldahl distillation unit, comprising a bar with six spring clips to grip the necks of distillation flasks. The holder clamps to stand NR-030.

To take flasks	300/500	800/1000 ml	
Each	**£6·00**	**6·20**	*bx*

NR-036

NR-036
CONDENSER RACK, for *Gallenkamp* Kjeldahl distillation unit, constructed of tubular copper with spring clips suitable to take 30 cm Liebig condensers NR-210 and NR-212. The horizontal tubes of the rack form the water supply and waste pipes and are fitted with corrugated nozzles for rubber tubing connections to the six condensers which operate in parallel. Each **£34·00** *bx*

NR-040

NR-040
CONDENSER COOLING TANK, for *Gallenkamp* Kjeldahl distillation unit to clamp to stand NR-030. Comprises a stoved grey enamelled copper tank with tubulures at top and bottom into which six monel metal or glass condenser tubes may be fitted using rubber stoppers NR-215, size 23. Dimensions 92 × 5 × 30 cm high. **Without condenser tubes or stoppers.**
Each **£47·00** *bx*

NR-042
NR-044

NR-043
NR-045

ACCESSORIES

NR-215	**Stopper,** rubber, size 23, to fit tubulures of above tank and bored 10 mm to take condenser tube. For price see entry in List No. sequence.				
NR-042	**Condenser tube,** monel metal, with downward sloping limb	Ten	**£58·00**	Each **£6·40**	*bx*
NR-043	**Condenser tube,** monel metal, with upward sloping limb	Ten	**£58·00**	Each **£6·40**	*bx*
NR-044	**Condenser tube,** glass, downward sloping limb.	Ten	**£1·80**	Each **£0·25**	*ax*
NR-045	**Condenser tube,** glass, upward sloping limb.	Ten	**£1·80**	Each **£0·25**	*ax*

Gallenkamp KJELDAHL EQUIPMENT

6-TESTS HEATER UNITS

The *Gallenkamp* electric and gas units and the *Electrothermal* electric unit have similar fittings by which they can be suspended on stands NR-020 or NR-030. When used as free-standing units, a pair of support rods NR-094 may be attached to the *Gallenkamp* heater units for fitting flask rest NR-022. The *Electrothermal* heater unit is supplied with a pair of support rods and a flask rest. Overall width of each unit is 97 cm.

NR-080

HEATER UNIT, *Gallenkamp*, electric, comprising six nickel-chromium spiral elements on fireclay formers mounted in an enamelled steel case. The elements have good thermal insulation and each has a replaceable asbestolite cover for supporting a flask. The heaters are individually controlled by energy regulators. **Supplied with asbestolite covers NR-086, for flasks size 500 ml. Without support rods or flask rest.** Maximum load 3 kW. For a.c. single phase supplies.

For 220/240V	Each	**£84·00**	*bx*
For 200/210V	Each	**£86·00**	*bxN*
For 110/120V	Each	**£86·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS AND ACCESSORIES

NR-086 **Asbestolite covers.**

Flask size	300	500	800/1000 ml	
Set of 6	**£6·20**	**6·20**	**6·20**	*bx*

NR-088 **Heating element, 500W** ... ... Each **£1·65** *b x*

NR-094 **Support rod.** See entry below.

When ordering replacement parts please specify serial number of unit and frequency of electrical supply.

NR-090

HEATER UNIT, *Gallenkamp*, gas, comprising a bank of six burners with individual control taps and a stove enamelled steel case. Each burner is surrounded by heat insulating material and is supplied with a dished rust resistant iron wire gauze cover. **For operation on town (coal) gas** ... ... Each **£71·00** *bx*

NR-091

HEATER UNIT, *Gallenkamp*, as NR-090 but for operation on **natural (methane) gas** ... Each **£73·00** *bx*

REPLACEMENT PART for NR-090 and NR-091

NR-092 **Wire gauze cover** ... ... Pack of 6 **£3·60** *bx*

ACCESSORIES for NR-090 and NR-091

NR-094 **Support rods,** for holding flask rest NR-022. Pair **£1·05** *bx*

NR-022 **Flask rest.** For details and price see entry in List No. sequence.

NR-100

HEATER UNIT, *Electrothermal*, electric. Comprising a bank of six heating mantles mounted in an aluminium case. Each heater is controlled by an energy regulator and there is an indicator light for each circuit. With support rods and flask rest. For 100/120, 200/220 or 230/250V a.c. single phase supplies.

Ref. No.	MQ3866	MQ3867	
Flask sizes	100/300	500 ml	
Maximum load	1·8	2·7 kW	
Each	**£111·95**	**131·90**	*fxN*

When ordering please state voltage and frequency of supply.

NR-080 with NR-094 and NR-022

NR-090 with NR-094 and NR-022

NR-100

Gallenkamp KJELDAHL EQUIPMENT

FUME EXTRACTION ACCESSORIES

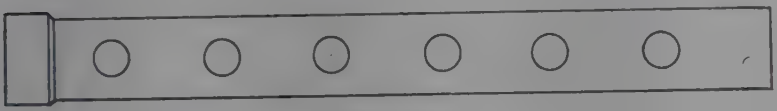
Small numbers of digestions may be carried out in a fume cupboard using a heater bank and flask rest. This method is not recommended for more than occasional use because of the risk of sulphuric acid fumes causing damage to the heater and fume extraction system. A fume extraction system fabricated in rigid PVC is listed below for routine work and may be installed in any laboratory.

The fumes are extracted by an ejector and exhausted outside the building through PVC trunking.

All components are listed separately so that a selection can be made to suit any particular location. The vapour tube, end cap, and ejector unit can be assembled either way round to provide exhaust on left or right.

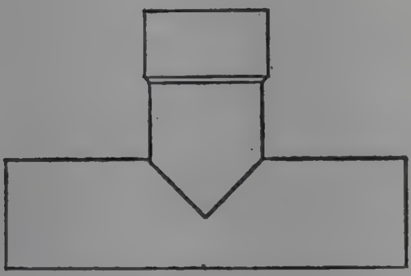
Socket ends are of a size to fit accurately over plain ends. Temporary joints may be made with a smear of grease. Permanent joints are made by painting both components with welding solution and pushing them together.

NOTE: This type of installation is suitable for an ejection path of up to 600 cm, either straight or with one bend. We will be pleased to offer ejection systems for more complex situations on receipt of full details and dimensioned sketch of site.

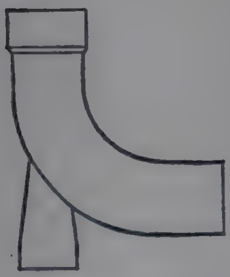


NR-120

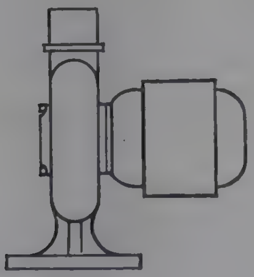
NR-124



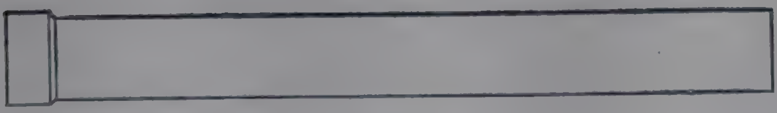
NR-128



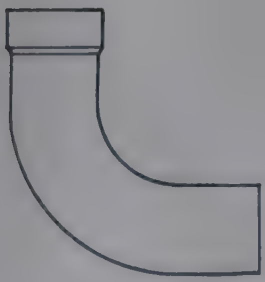
NR-132



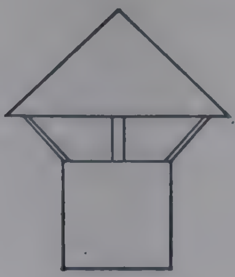
NR-140



NR-160



NR-164



NR-170

NR-120
VAPOUR TUBE, PVC, 10 cm internal diameter, overall length approx. 107 cm, with six holes to take necks of digestion flasks up to 1000 ml capacity. Socket at one end for fixing to ejector ... ... Each **£8·00** *bx*

NR-124
END CAP, PVC, with drain tube, to fit vapour tube NR-120 ... ... Each **£5·25** *bx*

NR-128
T-TUBE, PVC, with socket on central limb, for central fume extraction from two vapour tubes NR-120. Each **£6·25** *bx*

NR-132
EJECTOR UNIT, PVC, all-welded construction, capable of fume extraction from one or two vapour tubes NR-120 connected in series or parallel. Requires fan NR-140, flexible metallic tubing NR-144, sleeves NR-146 and clips NR-148 ... ... Each **£16·50** *bx*

NR-140
FAN, with integral $\frac{1}{6}$ hp induction motor and condenser. For 200/250V 50 Hz single phase supplies. Suitable for ejection path not exceeding 600 cm (see Note above). Each **£59·00** *mx*

NR-144
FLEXIBLE METALLIC TUBING, 7·5 cm diameter, for connecting fan NR-140 to ejector unit NR-132. **Without rubber connecting sleeves or hose clips.** Per metre **£2·05** *bx*

NOTE: Approx. 1 metre required if used with bench stand NR-016.
Approx. 0·5 metre required if used with floor stand NR-020.

NR-146
CONNECTING SLEEVE, canvas lined rubber, for connecting NR-144 to fan NR-140 ... Each **£0·55** *cx*

NR-148
HOSE CLIPS, for above ... Set of 2 **£0·55** *bx*

NR-160
TUBES, PVC, 10 cm internal diameter, with socket at one end.

Length nominal	90	150 cm	
Each	**£3·50**	**4·80**	*bx*

NR-164
ELBOW, PVC, 90°, with socket at one end. Each **£8·25** *bx*

NR-170
COWL, PVC ... ... Each **£8·75** *bx*

NR-174
WELDING SOLUTION, sufficient for ten joints, in can containing approx. 280 ml ... Per can **£0·95** *bx*

KJELDAHL GLASSWARE

Regd.

The specimen assemblies A and B illustrated show two of the many combinations possible by selection from the glassware listed below.

NR-200

SPLASH HEAD, Kjeldahl type, AG, borosilicate glass. Length of side tube 15 cm, sloping downwards.
Ten **£12·80** Each **£1·45** *ax*

NR-204

SPLASH HEAD, AG, as NR-200 but with side tube sloping upwards ... ... Ten **£12·80** Each **£1·45** *ax*

NR-210

CONDENSER, Liebig type, AG, borosilicate glass, comprising inner tube with end bent up to match splash head NR-200 and 30 cm long jacket attached by rubber tubing ... ... Ten **£8·00** Each **£0·88** *ax*

NR-212

CONDENSER, AG, as NR-210 but with inner tube bent down to match splash head NR-204.
Ten **£8·00** Each **£0·88** *ax*

REPLACEMENT PARTS

NR-044 Inner tube, for NR-212 ...
NR-045 Inner tube, for NR-210 ...
} For prices see entries in List No. sequence.

ACCESSORY

TX-750 **Tubing, neoprene,** N8, to connect splash head to condenser. For details and price see entry in List No. sequence.

NR-215

STOPPERS, natural red rubber, bored with 10 mm hole to connect splash heads to flasks and condenser tubes NR-042 to NR-045 to tank NR-040. In packs of 6.

Stopper size	23	29	31	
For flask size	300	500/800	1000 ml	
10 packs	**£4·60**	**6·20**	**7·60**	*bx*
Pack	**£0·51**	**0·70**	**0·84**	

NR-220

TAP FUNNEL, AG, cylindrical dropping, open top 100 ml, with stem bent to clear splash head.
Ten **£12·80** Each **£1·45** *ax*

NR-224

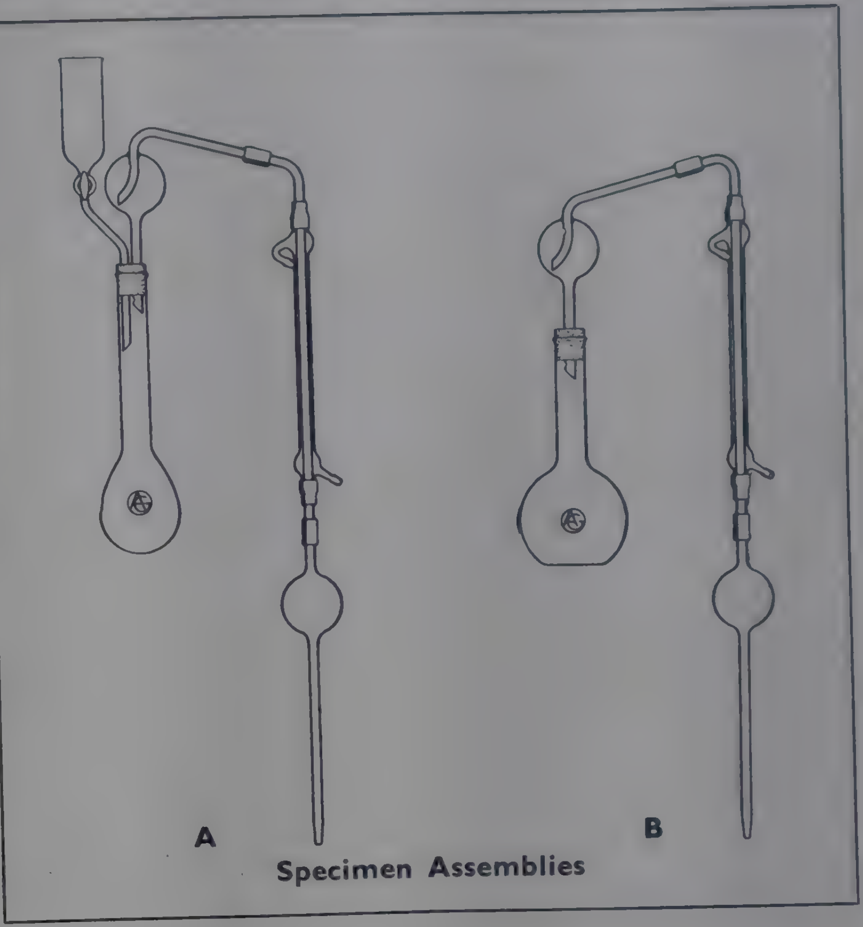
SAFETY BULB ABSORBER TUBE, AG, for use with 500 ml conical flasks.
Ten **£4·80** Each **£0·53** *ax*

NR-230

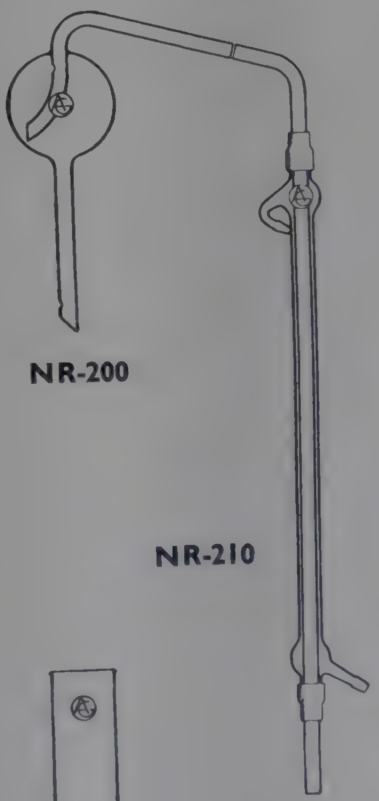
BULB STOPPER, AG, for Kjeldahl flasks.
Ten **£2·00** Each **£0·26** *ax*

Flasks for use in Kjeldahl determinations

KJELDAHL FLASKS	300 to 800 ml see FJ-160	For details and prices see entries in List No. sequence.
ROUND BOTTOM FLASKS	500 and 1000 ml see FJ-010	
CONICAL FLASKS	500 ml see FJ-050	

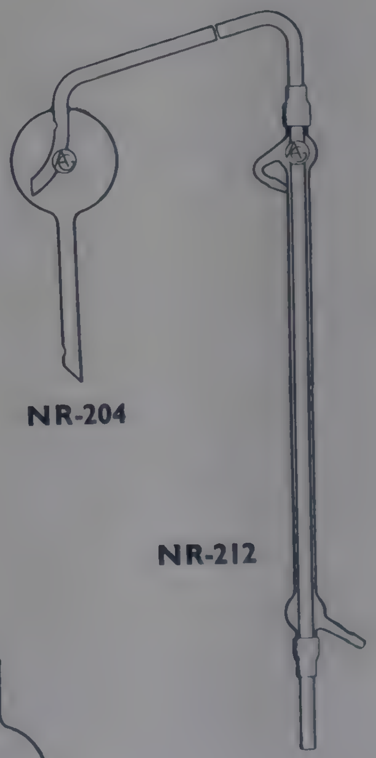


Specimen Assemblies



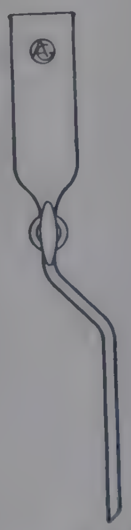
NR-200

NR-210

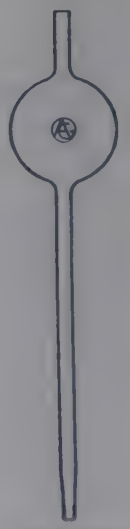


NR-204

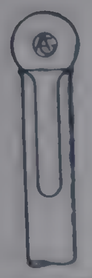
NR-212



NR-220



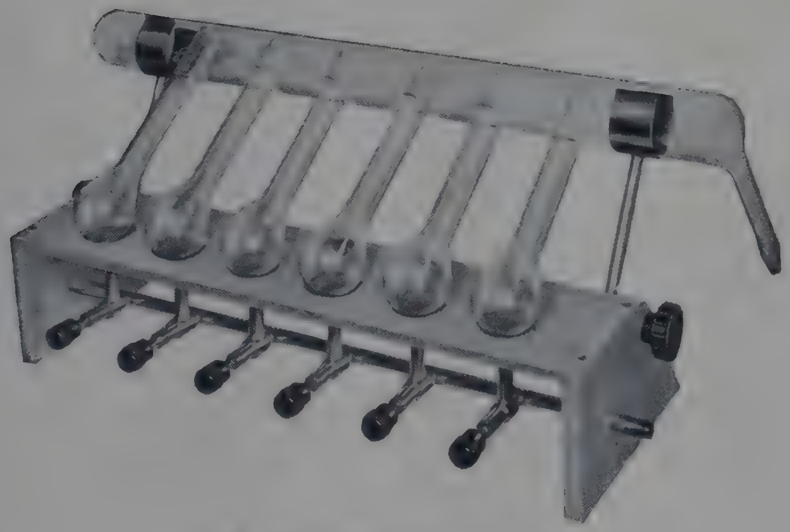
NR-224



NR-230

Gallenkamp MICRO-KJELDAHL APPARATUS

NR-410 with exhaust tube and flasks



NR-420 with exhaust tube and flasks (NR-425 is similar)

NR-510

DIGESTION STANDS

NR-410

DIGESTION STAND, micro-Kjeldahl, *Gallenkamp*, electrically heated, to hold six 30 ml digestion flasks. Constructed of sheet metal with asbestolite heating unit and ends. Heating is by nickel-chromium spirals. Adjustable spring clips are fitted to support a glass exhaust tube. For 220/240V a.c. single phase or d.c. supplies. **Without flasks or exhaust tube** ... ... Each **£50·00** *bx*

Also available for other voltages to order.

REPLACEMENT PART

NR-412 **Heating element** ... ... Each **£1·15** *bx*

NR-420

DIGESTION STAND, micro-Kjeldahl, *Gallenkamp*, gas heated, to hold six 30 ml digestion flasks. The stand is constructed in asbestolite and the burner tube has six gas jets with individual control valves. Spring clips on adjustable arms support the exhaust tube. Supplied with six wire gauzes but **without flasks or exhaust tube. For town (coal) gas** ... ... Each **£12·75** *bx*

NR-425

DIGESTION STAND, micro-Kjeldahl, *Gallenkamp*, as NR-420 but with burners suitable for **natural (methane) gas** ... ... Each **£18·00** *bx*

REPLACEMENT PART for NR-420 and NR-425

NR-426 **Wire gauzes.** In pack of 12 ... ... Pack **£0·50** *bx*

ACCESSORY for NR-410 to NR-425

FJ-170 **Flasks,** Kjeldahl, 30 ml. For price see entry in List No. sequence.

NR-450

EXHAUST TUBE, (AG), borosilicate glass, to BS 1428 Part B1 with six holes at centre distances of 55 mm, and tubulure for extraction pump connection.
Ten **£19·50** Each **£2·15** *ax*

NR-452

EXHAUST TUBE, (AG), as NR-450 but with larger holes to conform with BS 1428 Part B3.
Ten **£21·00** Each **£2·35** *ax*

†KING TYPE DIGESTION STAND

Used for non-protein nitrogen, total base and many other estimations, using tubes, crucibles or digestion/centrifuge tubes NR-530, where controlled heating is required.
The sheet steel and asbestos stand will hold 24 tubes up to 150×19 mm, with a minimum length of 75 mm. The tubes rest against a stainless steel support.
Two nickel chromium spirals heat the bottom and sides of the tubes, respectively. Heating can be controlled to give gentle bottom heat with high top heat, gentle bottom and top heat and full bottom heat.

NR-510

DIGESTION STAND, micro-Kjeldahl, *Gallenkamp*, as specification, electrically heated for 220/240V a.c. single phase or d.c. supplies ... ... Each **£53·00** *bx*

Also available for other voltages to order.

REPLACEMENT PART

NR-512 **Heating elements,** set of two... ... Set **£1·70** *bx*

When ordering please state voltage and frequency of supply.

NR-530

TUBES, digestion/centrifuge, (AG), borosilicate glass, 110×16·5 mm with constriction approximately 19 mm from bottom ... ... Ten **£1·10** Each **£0·18** *ax*

† King and Wootton, 'Micro-Analysis in Medical Biochemistry'. 3rd Ed., p. 17, Churchill, London.

Regd.

MICRO-KJELDAHL APPARATUS

DISTILLATION APPARATUS

To BS 1428 Part B1 with Parnas-Wagner automatic discharge. The digestion products are introduced into the vacuum jacketed distillation vessel, treated with alkaline reagents and steam distilled. Steam is generated in the bolthead flask. The ammoniacal distillate is led through the splash head and condenser into a flask containing suitable absorbent solution. At the end of the distillation, removal of the heat source from the steam generator causes a partial vacuum in the system which transfers the contents of the distillation vessel into the cylindrical waste receiver leaving the distillation vessel empty for the next test.

NR-650

DISTILLATION APPARATUS, micro-Kjeldahl, Ⓐ, borosilicate glass, to BS 1428 Part B1, with automatic discharge. Comprising condenser tube NR-665 and components NR-652 to NR-658 listed below mounted on 60 cm retort stand with clips ... ... Each **£29·00** *bx*

REPLACEMENT PARTS

NR-652	**Distillation flask,** with vacuum jacket.	Each	**£5·20**	*ax*
NR-653	**Receiver,** cylindrical	Each	**£1·10**	*ax*
NR-654	**Condenser jacket**	Each	**£1·80**	*ax*
NR-665	**Condenser tube,** borosilicate glass. For price see entry below.			
NR-656	**Condenser funnel**	Each	**£0·85**	*ax*
NR-657	**Sample funnel,** 50 mm dia.	Each	**£0·55**	*ax*
NR-658	**Steam generating flask,** 1 litre ...	Each	**£1·25**	*ax*

ACCESSORY

FJ-050	**Flask,** 100 ml, to receive distillate	For details and prices see entries in List No. sequence.
NR-668	**Condenser tube,** silver, interchangeable with NR-665.	

DISTILLATION APPARATUS

To BS 1428 Part B3, non-transference pattern.

The same flask is used for digestion and distillation. After digestion, the products are diluted and the flask assembled to the stillhead. Alkaline reagents are added through the funnel, the air inlet tube inserted and the flask heated while air is pumped through its contents. The ammonia and water vapour are led through the splash head and condenser into a receiver flask. To terminate the test the heat source and air inlet tube are removed.

NR-660

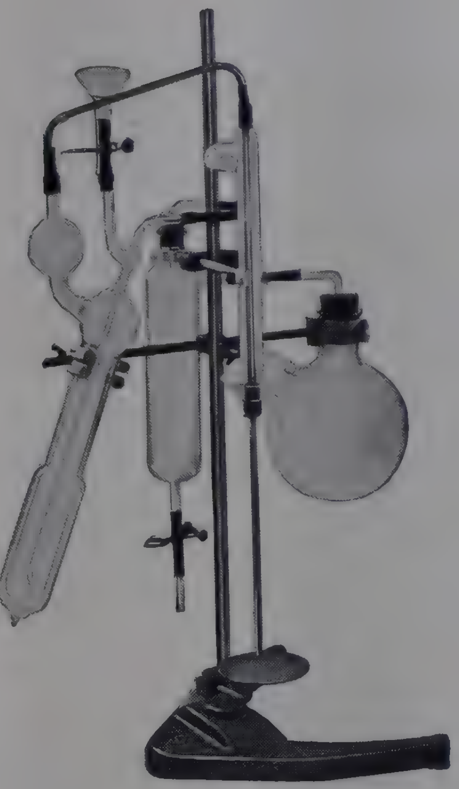
DISTILLATION APPARATUS, micro-Kjeldahl, Ⓐ borosilicate glass, non-transference pattern to BS 1428 Part B3. Comprising components NR-654 to NR-665 listed below and 45 cm retort stand with mounting clips. Each **£18·00** *bx*

REPLACEMENT PARTS

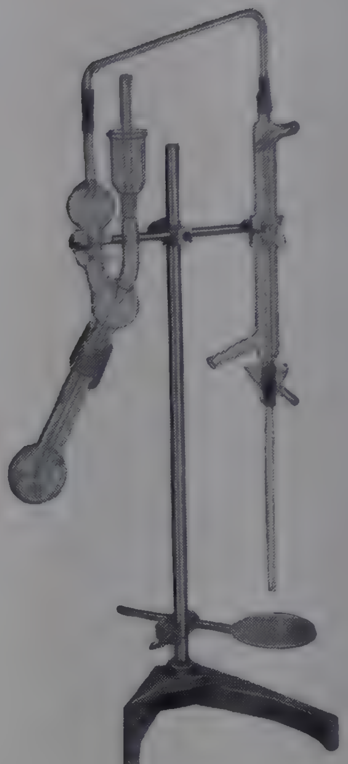
NR-654	**Condenser jacket**	For prices see entries above.		
NR-656	**Condenser funnel**			
NR-662	**Digestion/distillation flask,** with 19/26 socket.	Each	**£1·00**	*ax*
NR-663	**Stillhead,** with 19/26 cone and 10/19 socket.	Each	**£4·00**	*ax*
NR-664	**Inlet tube,** with 10/19 cone	Each	**£0·45**	*ax*
NR-665	**Condenser tube,** borosilicate glass ...	Each	**£0·60**	*ax*
NR-709	**Peg stopper.** For price see entry in List No. sequence.			

ACCESSORIES

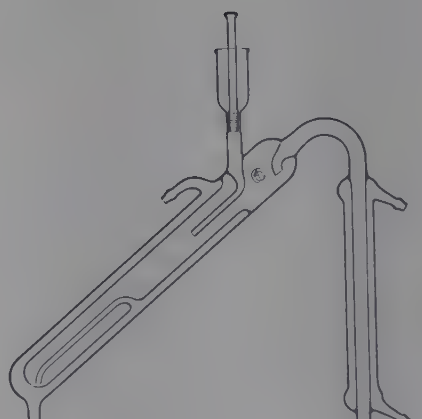
NR-668	**Condenser tube,** silver, interchangeable with NR-665.	Each	**£10·70**	*mx*
AF-400	**Air pump** suitable for use with NR-660	For details and prices see entries in List No. sequence.		
FJ-050	**Flask,** 100 ml, to receive distillate			



NR-650



NR-660



NR-680

MARKHAM APPARATUS

NR-680

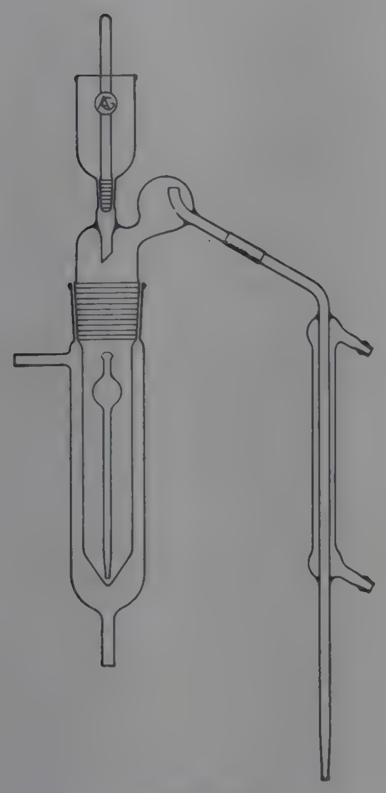
DISTILLATION APPARATUS, ultra-micro-Kjeldahl, Ⓐ borosilicate glass, Markham pattern. Designed for use in biochemical work on quantities of distillate up to 2 ml. One piece assembly with 7/11 stopper ... ... Each **£6·90** *ax*

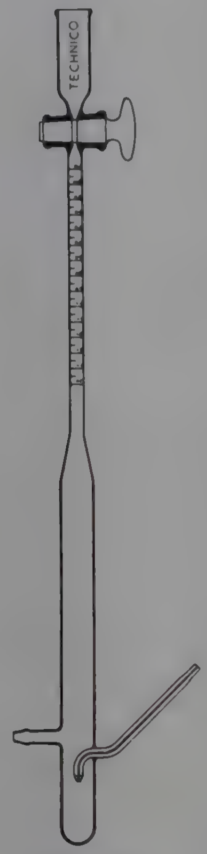
MARKHAM micro-Kjeldahl apparatus see **QUICKFIT SECTION.**

MICRO-KJELDAHL APPARATUS

Regd.

†HOSKINS MICRO-KJELDAHL DISTILLATION APPARATUS


NR-690



NT-030

For convenient and precise distillations with 40 or 80 ml samples. The apparatus incorporates a steam condensation-suction device for the automatic removal of the sample thereby enabling successive determinations to be made rapidly.

The apparatus comprises an outer vessel with 50/42 socket, steam entry sidearm and drain tube: two alternative inner tubes with 50/42 cone, splash head, funnel with 10/19 socket for peg stopper and a narrow jacket condenser.

† Reference. Hoskins, Analyst **69**, 1944, 271.

NR-690

MICRO-KJELDAHL DISTILLATION APPARATUS, Hoskins, Ⓐ borosilicate glass, as specification **with 80 ml inner tube** ... ... Each **£10·00** *ax*

NR-691

MICRO-KJELDAHL DISTILLATION APPARATUS, Hoskins, Ⓐ, as above but **with 40 ml inner tube.** Each **£9·60** *ax*

COMPONENTS

NR-692	**Inner tube, 80 ml,** with splash head and funnel, on 50/42 cone	Each	**£6·25**	*ax*
NR-693	**Inner tube, 40 ml,** with splash head and funnel, on 50/42 cone	Each	**£5·85**	*ax*
NR-704	**Outer vessel,** with 50/42 socket ...	Each	**£2·00**	*ax*
NR-705	**Condenser**	Each	**£1·25**	*ax*
NR-709	**Peg stopper,** cone 10/19 for funnel ...	Each	**£0·50**	*ax*

NITROMETERS

NT-030

NITROMETER, micro, *Technico*, to BS 1428 Part D3. Capacity 1·5 cm³ subdivided in 0·01 cm³. With **works certificate of examination** stating the volume at five points of the scale ... ... Each **£8·65** *ax*

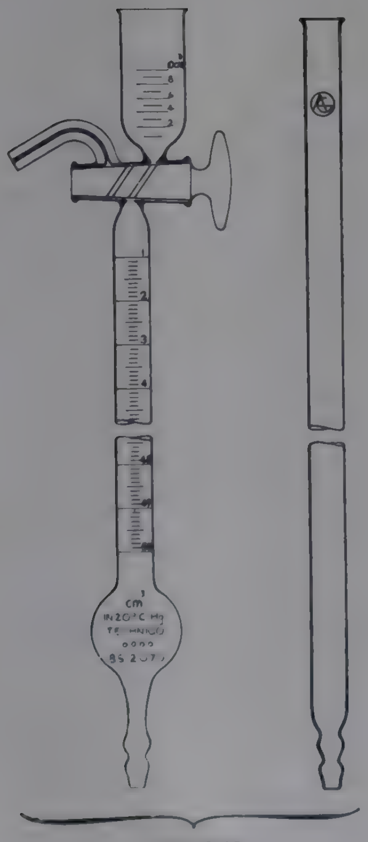
NT-040

NITROMETER, *Technico*, **Lunge†,** borosilicate glass, to BS 2070. Comprises measuring tube graduated 1 to 50 cm³ in 0·1 cm³, with a double oblique bore stopcock and 10 cm³ cup graduated in 2 cm³. With plain levelling tube. Set **£6·25** *ax*

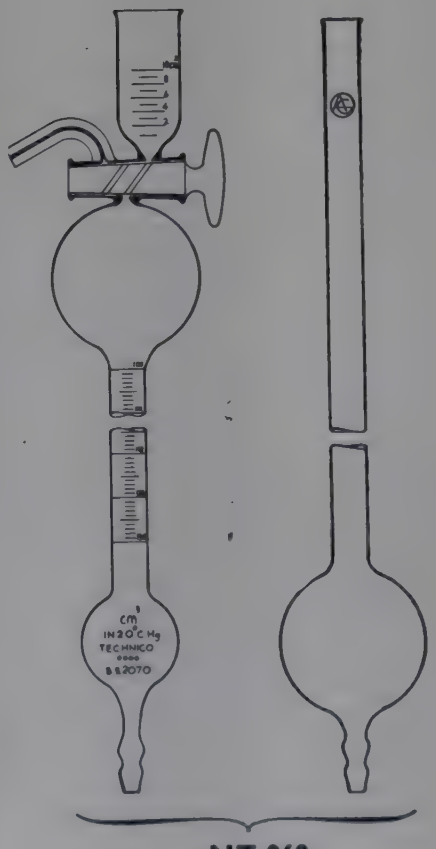
† Lunge and Ambler 'Technical Gas Analysis', p. 371.

NT-060

NITROMETER, *Technico*, **Lunge,** borosilicate glass, to BS 2070, particularly suitable for nitrocellulose and nitroglycerine determinations. Comprises measuring tube graduated from 100 to 130 cm³ in 0·1 cm³ with a 100 cm³ bulb surmounted by a double oblique bore stopcock and a 10 cm³ cup graduated in 2 cm³. With plain levelling tube. Set **£7·25** *ax*



NT-040



NT-060

Gallenkamp CALIBRATING OIL BATHS, 200°C

For comparisons of Thermometers, Thermocouples and other similar applications.

- **Manually controlled model for steadily changing temperature**
- **Thermostatically controlled model for constant or changing temperatures**
- **Temperature variation ±0·25degC**

OPERATION

The bath is heated by a double, tubular immersion heater rated at 250 and 1250W, of which the latter portion is used solely as a boost heater. The heating and cooling rates for the manually controlled model are:—

Temperature of bath	50°C	200°C
Heating rate (250W heater)	1degC/min	0·4degC/min
Cooling rate	0·05degC/min	0·5degC/min

Time to heat from 20° to 200°C (with boost heater) 40 min.

When the bath is stirred, temperature variation over 20 cm diameter and 23 cm depth is only ±0·25degC.

If it is necessary to adjust the heating and cooling rates a variable transformer ED-601 may be incorporated into the 250W heater circuit.

Thermostatically Controlled Model. For making comparisons at constant temperatures in addition to the steadily rising or falling temperatures obtained with the standard apparatus. The modified bath is fitted with an adjustable contact thermometer, an electronic relay and a stirrer. Temperature fluctuation is within 0·2degC.

DESIGN

The bath is a welded cylindrical tank which is of cadmium plated steel. There is glass wool insulation and a heat break between the tank and the casing and a removable top cover is fitted. The support rod at the back of the casing is for mounting a stirrer motor.

A 3-pin socket and plug for connecting the stirrer motor are fitted and the bath is supplied with a mains connecting cable.

DIMENSIONS

Inner tank	30 cm deep, 20 cm dia.
Outer casing	35 × 28 × 28 cm
Capacity	9 litres

OD-050 with SS-425, SS-455 and SS-548

OD-050

OIL BATH, calibrating, *Gallenkamp*, **200°C max.,** as specification, **manually controlled.** With plain removable cover but **without stirrer.** For a.c. single phase supplies.

For 220/240V	Each	**£89·00**	*bx*
For 200/210V	Each	**£91·00**	*bxN*
For 110/120V	Each	**£91·00**	*bxN*

OD-051

OIL BATH, calibrating, *Gallenkamp*, **200°C max.,** as OD-050 but **thermostatically controlled.** Fitted with stirrer assembly, contact thermometer range 0–200°C and electronic relay. For a.c. single phase supplies.

For 220/240V	Each	**£191·00**	*bx*
For 200/210V	Each	**£196·00**	*bxN*
For 110/120V	Each	**£196·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS AND ACCESSORIES

OD-052	**Immersion heater**	Each **£12·50** *bx*
***OD-054**	**Contact thermometer,** for OD-051, range 0 to 200°C.	Each **£11·00** *cx*
ED-601	**Transformer,** *Variac*, enclosed type for 240V a.c.	For details and prices see entries in List No. sequence.
OD-150	**Oil,** for filling bath	
SM-610	**Bosshead,** *Technico*	
SS-425	**Stirrer, Handilab**	
SS-455	**Chuck,** for fitting SS-548 to stirrer SS-425	
SS-548	**Flexible stirring rotor,** with 46 cm stainless steel shaft	

When ordering replacement parts please state serial number of bath and supply voltage.

Gallenkamp THERMOSTATIC OIL BATHS, 200°C

REGD. TRADE MARK

For a wide range of applications such as oxidation stability tests on oils and greases and as a heating source in extractions and distillations and any work requiring close temperature control.

- **Two sizes available—capacities 27 and 60 litres**
- **Temperature fluctuation within 0·5degC**
- **Powerful motor driven stirrer**

OD-110

DESIGN

The baths are strongly constructed in steel throughout with a rectangular welded inner tank with a durable black matt finish. The large area floor is strong enough to support heavy objects.

DIMENSIONS

Size	1	2	
Overall, excluding control box	50×42×29	65×48×39	cm
Internal	39×30×23	55×38×30	cm
Working space	28×30×20	43×38×28	cm
Capacity	27	60	litres
Maximum power rating	2	3·5	kW

OPERATION

All controls are mounted in the control box which bridges one end of the bath, leaving a maximum of space free from obstruction.

Each bath is heated by two independently switched tubular immersion heaters rated according to the size of the bath.

One heater in each bath is used as a boost heater.

The thermostat, which is mounted in the control box, operates in conjunction with a hotwire relay. A powerful shaded pole motor, also fitted into the control box, drives a stirring rotor attached to a flexible stainless steel shaft.

Heating rates

Size 1	20° to 200°C in 80 min
Size 2	20° to 200°C in 110 min

Temperature variation

Both sizes within ±0·5degC throughout the working space.

Temperature fluctuation

Both sizes within 0·5degC.

OD-110

OIL BATHS, thermostatic, 200°C max., *Gallenkamp*, electrically heated, as specification. For a.c. single phase supplies.

Size		1	2
For 220/240V	Each	**£141·00**	**163·00** *bx*
For 200/210V	Each	**£145·00**	**167·00** *bxN*
For 110/120V	Each	**£145·00**	**167·00** *bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

OD-120	**Immersion heater,** 1000W for size 1.	Each	**£5·70**	*bx*
OD-121	**Immersion heater,** 1500W for size 2.	Each	**£5·90**	*bx*
OD-122	**Boost heater,** 1000W for size 1 ...	Each	**£6·20**	*bx*
OD-123	**Boost heater,** 2000W for size 2 ...	Each	**£7·20**	*bx*
OD-124	**Stirrer motor,** for both sizes	Each	**£8·20**	*bx*

When ordering replacement parts please state serial number of bath and supply voltage.

ACCESSORIES

OD-150	**Oil,** opaque, with viscosity characteristics suitable for use in above oil baths, between 50 and 200°C. Flash point 232°C. In 5 gallon (22·5 litres) non-returnable drum. Each **£7·10** cx	
AU-447	**Stopcock,** polythene, suitable for above oil drum	For details and prices see entries in List No. sequence.
LX-110	**Lubricant,** suitable for motor bearings	

Gallenkamp LABORATORY AND INDUSTRIAL OVENS

SECTION INDEX

List No.	Description	Internal dimensions cm H W D	Maximum temperature °C	Page
OV-010	Hotbox Oven/Sterilisers	33 × 48 × 33 48 × 48 × 43	200	486
OV-060	Economy Oven	28 × 38 × 30	200	487
OV-062	,, ,, (glass door)	,, ,, ,,	160	487
OV-160/165	BS Ovens	46 × 40 × 36 61 × 51 × 46 76 × 61 × 46	250	488/490
OV-330/335	BS Ovens	46 × 40 × 36 61 × 51 × 46	300	491/492
OV-420/425	BS Oven/Sterilisers	76 × 61 × 46	250	493
OV-440/445	Moisture Extraction Ovens	76 × 61 × 46	250	494
OV-480/484	Oven Stands	— — —	—	495
OV-620	Humidity Oven	68 × 61 × 46	60	496/497
OV-700	Humidity Oven	71 × 81 × 68·5	100	498/502
OV-880	Drying Cabinet	72 × 64 × 37	120	503
OV-930	Vacuum Ovens	Dia. Depth 30·5 × 32·5 37 × 50	150	504

Embedding Oven see HJ-100

Vacuum Drying Oven see MV-600

For details and prices of the above see entries in List No. sequence.

DEFINITIONS OF TERMS

The following terms, defined in BS specifications, are used in the tabulated performance data given for *Gallenkamp* ovens:

Working space—That portion of the internal space which is above the lowest shelf and not less than 3 cm from any wall (including the roof).

Oven temperature—The temperature at the centre of the working space.

Temperature variation—The difference at any moment between the temperature at the centre of the working space and at any other point in the working space.

Temperature fluctuation—The short term changes in temperature (due to operation of the temperature controller) at any point in the working space.

Recovery—The time taken for an oven to regain temperature within 1degC after the temperature has been reduced from an initial steady state by opening the door fully for one minute.

USEFUL DATA

Load indicator lamps—Most *Gallenkamp* ovens are fitted with load indicator lamps. With ovens controlled by hydraulic thermostats the lamp lights during the periods when the thermostat switches power to the heater. With ovens controlled by the solid state *Compenstat* the lamp lights as the power to the heater is **reduced.** The light intensity thus increases as the set temperature is approached and reaches a maximum when the temperature is reached.

Maximum power rating—The figure included in the Technical Data for each oven is the maximum power that the apparatus will require for any combination of settings of its controls. The electricity supply outlet to which the apparatus is connected must have sufficient current carrying capacity to supply this power otherwise the mains installation may be damaged. Over a period of time the **actual power consumption** of an apparatus incorporating controls for temperature, motor speed, etc., will be normally very much less than the maximum rating.

Safety thermostats—Most *Gallenkamp* ovens are fitted with an over-ride thermostat which, when set correctly, will maintain **coarse** control of temperature in the event of failure in the main thermostat system.

Choice of size—One major factor to influence the choice of an oven is the internal capacity. It is always advisable to have ample capacity for the work in hand. Undue congestion of the oven working space **invariably** leads to a loss of performance.

Gallenkamp HOTBOX OVEN/STERILISERS, 200°C

OV-010 Size 1

PERFORMANCE

For definitions of terms see page 485.

Size No.	1	2	
Temperature fluctuation at 100°C	±1·5	±1·5	degC
Time to heat to 200°C	45	60	min
Power rating max.	500	750	W

DIMENSIONS

	H W D	H W D	
Internal	33×48×33	47×48×43	cm
Overall	56×59×48	70×59×58	cm
Weight, net	23	25	kg
Shelves			
Number supplied	2	3	
Number of positions	4	6	
Dimensions	48×30	48×40	cm

Economically priced, wide shelved ovens for general laboratory use including drying and sterilising.

- **Control by direct reading hydraulic thermostat**
- **Gravity convection**
- **Welded steel exterior**
- **Polished aluminium interior**
- **Large area grid shelves**
- **Both sizes accommodate pipette sterilising boxes SR-800**

DESIGN

Each oven has a welded steel exterior and a polished aluminium liner with fixed shelf positions. The sheathed heater mounted in the base is protected by a removable grid. Temperature control is by a direct reading thermostat scaled 30 to 200°C and a load indicator lamp is fitted. A fixed ventilator is provided in the top with a hole for inserting a mercury in glass thermometer.

The internal dimensions have been selected to provide extra wide shelves so that long pieces of glassware, such as pipettes, can be accommodated.

OV-010

OVEN/STERILISERS, HOTBOX, *Gallenkamp*, **200°C max.,** as specification, with hydraulic thermostat, load indicator lamp, shelves and sheathed heater. For single phase a.c. supplies.

Size No.		1	2	
For 220/240V	Each	**£72·00**	**95·00**	*bx*
For 110/120V	Each	**£74·00**	**97·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

OV-012 **Heating element.**

Size No.	1	2	
Each	**£2·50**	**2·80**	*bx*

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

ACCESSORIES

OV-014 **Extra shelf.**

Size No.	1	2	
Each	**£1·90**	**2·05**	*bx*

LB-150 **Labels, 'STERILE'** ... ...
SR-800 **Sterilising boxes** ... ...
TJ-050 **Thermometer, scale span 0 to 250°C** ... ...
TJ-170 **Thermometers, scale span 50 to 110°C and 150 to 210°C** ... ...

For details and prices see entries in List No. sequence.

For suitable **FLOOR STAND** see **OV-482** in List No. sequence.

Gallenkamp ECONOMY OVENS, 200°C and 160°C

For general work requiring stability over long periods, these ovens combine the reliable performance of the *Compenstat* with a simplicity of design and economy of price.

- *Compenstat* **direct reading hydraulic thermostat**
- **Gravity convection**
- **Wide shelves**
- **Adjustable ventilator**
- **Insulated metal or toughened glass doors**

DESIGN

The light-grey enamelled steel exterior encloses an efficiently lagged aluminium interior with fixed shelf runners. The shelves are perforated aluminium flanged sheets. A metal sheathed heater is fitted outside the bottom of the oven liner. Controls comprise the *Compenstat*, scaled 30 to 200°C, the load indicator lamp and the mains ON/OFF switch. An adjustable ventilator fitted in the top has a hole with clip for a 6 to 7 mm dia. mercury in glass thermometer.

Two alternative doors are offered—an insulated metal door with resilient gasket and a glass door with sprung phosphor bronze sealing strip. **The oven with glass door has a maximum working temperature of 160°C.** Both doors have fitted nameplates with pockets for test record cards.

PERFORMANCE

For definitions of terms see page 485.

Temperature fluctuation at 100°C less than ±0·5degC

Time to heat to 200°C (OV-060)	45 min
Power rating max.	650 W

DIMENSIONS

	H W D	
Internal	28×38×30	cm
Overall	53×51×43	cm
Weight, net	24	kg
Shelves		
Number supplied	2	
Number of positions	4	
	35·5×29	cm

For suitable **FLOOR STAND** see **OV-480** in List No. sequence.

Gallenkamp

OV-060

OV-060

OVEN, ECONOMY, *Gallenkamp*, **200°C max.,** as specification **with metal door,** *Compenstat* direct reading thermostat, load indicator lamp, mains switch, shelves, sheathed heater and adjustable ventilator. For single phase a.c. supplies.

For 220/240V … … … …	Each	**£95·00**	*bx*
For 200/210V … … … …	Each	**£96·00**	*bxN*
For 110/120V … … … …	Each	**£96·00**	*bxN*

OV-062

OVEN, ECONOMY, *Gallenkamp*, **160°C max.,** as specification and OV-060 **but with toughened glass door.** For single phase a.c. supplies.

For 220/240V … … … …	Each	**£96·00**	*bx*
For 200/210V … … … …	Each	**£97·00**	*bxN*
For 110/120V … … … …	Each	**£97·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

OV-066	**Heater,** 650W … … … …	Each	£5·20	*bx*

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

ACCESSORIES

OV-068	**Shelf** … … … … …	Each	£2·20	*bx*
TJ-050	**Thermometer,** scale span 0 to 250°C in 1degC. For full details and price see entry in List No. sequence.			

Gallenkamp BS OVENS, 250°C

TO BS 2648 and BS 3421

Modern heating, drying and sterilising ovens, scientifically designed to conform to the performance requirements of BS 2648 for electrically heated laboratory ovens and BS 3421 for electrically heated sterilising ovens.

Gallenkamp
OVEN BS
Gallenkamp
Gallenkamp

- Accurate temperature control by direct reading Compenstat (solid state) thermostat
- Safety thermostat for additional protection
- Available in three sizes up to 210 litres capacity
- Fan convection ensures temperature uniformity even at full load
- Unitised controls and printed circuit simplify maintenance and servicing
- Efficient insulation for cool exteriors and operating economy
- Recessed panel reduces possibility of inadvertent alteration of controls
- Stainless steel interior designed for easy cleaning

Gallenkamp BS OVENS, 250°C

(continued)

DESIGN

Exterior. The exterior of the oven is easily cleaned and is finished in a hard light-grey stoved enamel. The door gasket is of woven fibre and the door is provided with a plugged hole for fitting a dial temperature indicator OV-178. The adjustable door catch enables the door to be opened and closed easily but, being spring-loaded, holds the door firmly when shut.

Interior. The oven liner is of corrosion resistant, semi-polished stainless steel to BS 971, EN 58B with fixed shelf runners and removable baffle at the rear which guards the fan and heaters. There are no electrical connections within the working space. Since there are no inlets in the base the controls and circuits are protected from spillage.

Shelves. The grid steel wire shelves are electroplated with chromium and nickel.

Basket shelves with grid sides 7 cm high are available as optional extras. These are of similar construction and finish to the ordinary shelves and slide directly on to the shelf runners. They are convenient for pre-loading of small articles which can then be inserted quickly into the oven with minimum heat loss.

Heating and Air Circulation. Air drawn from the centre of the oven is recirculated to the top and bottom of the workspace by a rear mounted fan. The heater, which is sheathed in stainless steel, surrounds the fan and is shielded from the workspace by the baffle. The fan motor bearings require no lubricating.

Temperature control. Temperature is accurately and reliably controlled by a *Compenstat* (solid state) thermostat which is direct reading over the temperature range of the oven. An indicator lamp lights when the oven reaches set temperature. In addition a safety thermostat is fitted which may be set to any desired interval above the oven operating temperature. In the event of incorrect setting or failure of the *Compenstat*, the safety thermostat takes over control and a warning lamp indicates the fault condition.

Ventilation. An adjustable ventilator in the top of the oven may be opened to allow air drawn in by the fan to flow through the oven for fume or moisture extraction or be closed when ventilation is not required. The ventilator incorporates a clip to hold a mercury in glass thermometer and may be lifted out to provide a 2·8 cm dia. aperture for cables, tubing, etc.

PERFORMANCE

Data when tested to British Standard 2648 'Performance requirements for electrically heated laboratory ovens (unloaded)'.

For definitions of terms see page 485.

Size No.	1	2	3
At 100°C			
Temperature fluctuation	0·1	0·1	0·1degC
Temperature variation	1·0	1·5	2·0degC
Heating time to stability	35	45	50 min
Recovery	6	8	7 min
Ventilation rate	2000	2000	2000 l/hr
At 250°C			
Temperature fluctuation	0·1	0·1	0·1degC
Temperature variation	2·5	4·0	6·0degC
Heating time to stability	50	60	60 min
Recovery	20	20	20 min

Data when tested to British Standard 3421 'Performance of electrically heated sterilising ovens (loaded) at ambient plus 140°C'.

Size No.	1	2
Temperature drift during 2 hr period	0	0·5degC
Temperature variation	3·0	4·0degC
Heating time to stability	135	120 min

Note: Oven Size No. 3 does not conform with BS 3421. For large capacity oven/steriliser see OV-420.

DIMENSIONS

Size No.	1 H W D	2 H W D	3 H W D
Internal	46 × 40 × 36	61 × 51 × 46	76 × 61 × 46 cm
Overall	81 × 58 × 71	96 × 68 × 81	112 × 79 × 79 cm
Shelves			
Size (net usable)	38 × 34	48 × 44	58 × 44 cm
Number supplied	3	3	4
Number of positions	4	5	6
Interval between positions	11	11·5	12 cm
Basket shelves			
Size, internal	7 × 33 × 33	7 × 43 × 43	7 × 43 × 53 cm
Weight, net	56	78	94 kg
Power rating, max.	1·0	1·5	2·0 kW

Gallenkamp BS OVENS, 250°C

(continued)

OV-160

OVENS, BS, *Gallenkamp*, **fan convection, 250°C max.,** as specification, to BS 2648 (and BS 3421 size Nos. 1 and 2 only). With stainless steel interior, *Compenstat* (solid state) direct reading thermostat and independent safety thermostat. Fitted with load indicator and safety thermostat takeover indicator lamps and supplied with shelves. **Without thermometer.** For single phase supplies.

Size No.	1	2	3	
For 220/240V 50 Hz	**£172·00**	**196·00**	**220·00**	*bx*
For 200/210V 50 Hz	**£176·00**	**207·00**	**252·00**	*bxN*
For 110/120V 60 Hz	**£176·00**	**207·00**	**252·00**	*bxN*

OV-165

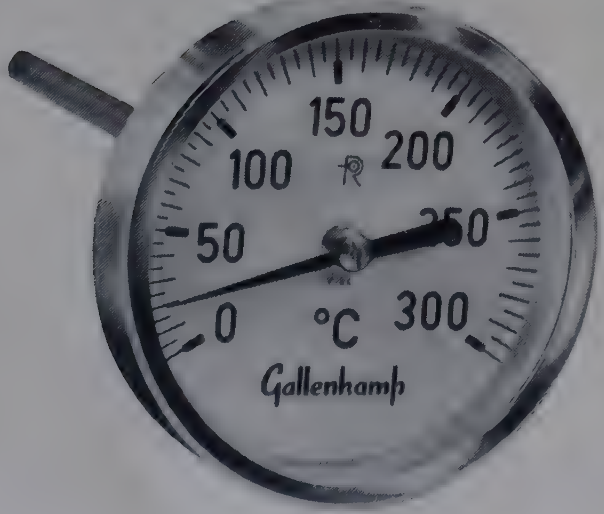
OVENS, BS, *Gallenkamp*, as OV-160 but **with double glazed window** 25×25 cm fitted in the door. For single phase supplies.

Size No.	1	2	3	
For 220/240V 50 Hz	**£202·00**	**226·00**	**250·00**	*bx*
For 200/210V 50 Hz	**£206·00**	**237·00**	**282·00**	*bxN*
For 110/120V 60 Hz	**£206·00**	**237·00**	**282·00**	*bxN*

When ordering please state voltage and frequency of supply.

For dimensions and technical data see previous page.

OV-176



OV-178

REPLACEMENT PARTS

OV-170 **Heaters.**

Oven Size No.	1	2	3	
Each	**£4·00**	**4·00**	**4·00**	*bx*

OV-172 **Motor, fan** ... ... Each **£11·00** *bx*

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

OV-174 **Shelves.**

Oven Size No.	1	2	3	
Each	**£1·95**	**2·25**	**2·70**	*bx*

ACCESSORIES

OV-176 **Basket shelves.**

Oven Size No.	1	2	3	
Each	**£4·80**	**5·80**	**6·50**	*bx*

OV-178 **Dial temperature indicator,** range 0 to 300°C, with retaining clip. For fitting through hole provided in oven door ... ... Each **£8·25** *bx*

TJ-060 **Thermometer,** range 0 to 250°C, to fit top ventilator clip. For general applications ... ...

TJ-170 **Thermometer,** range as selected, to fit top ventilator clip. For applications requiring a more accurate indication of temperature ... ...

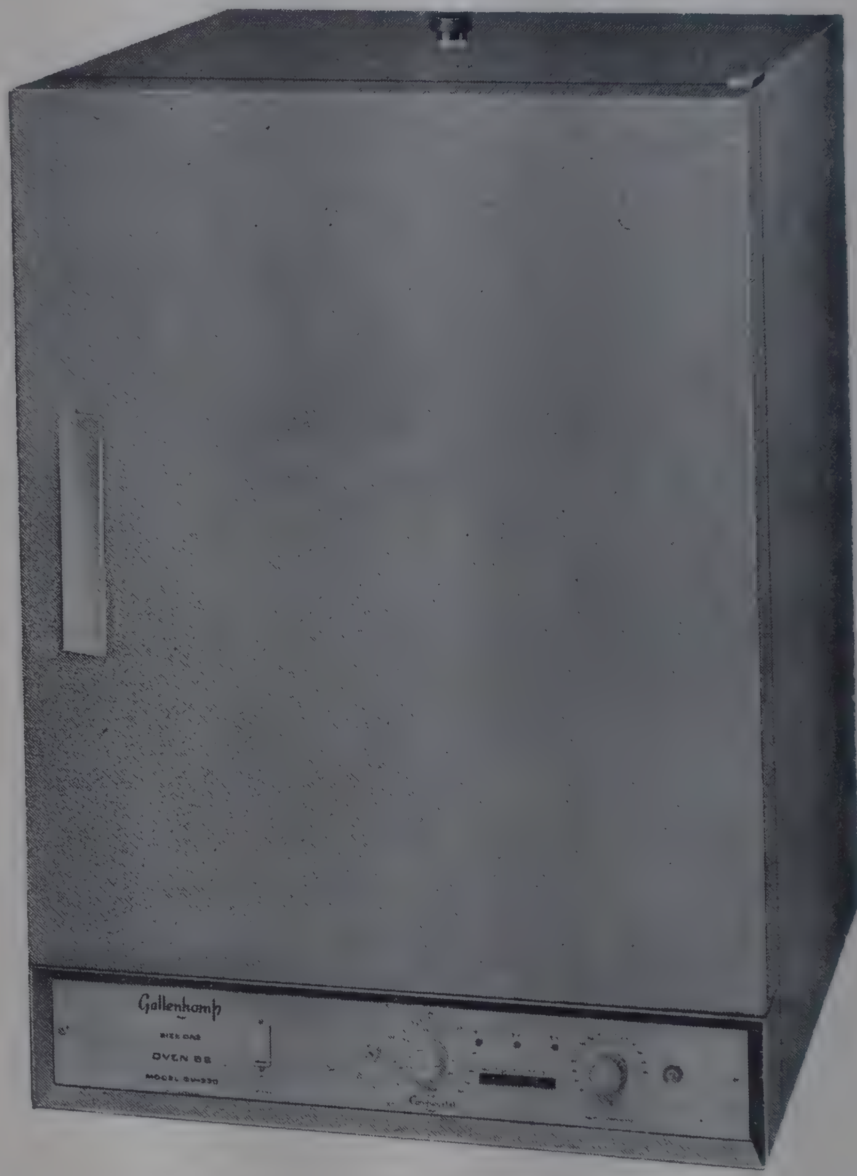
} For details and prices see entries in List No. sequence.

For suitable **FLOOR STANDS** see **OV-480** to **OV-484** in List No. sequence.

Gallenkamp BS OVENS, 300°C

With *Compenstat* (solid state) control and push-button preset temperature selection.

- **Accurate temperature control by direct reading *Compenstat* (solid state) thermostat**
- **Safety thermostat for additional protection**
- **Conform to the performance requirements of BS 2648 and BS 3421**
- **Fan convection ensures temperature uniformity even at full load**
- **Efficient insulation for cool exteriors and operating economy**
- **Unitised controls and printed circuit simplify maintenance and servicing**
- **Stainless steel interior designed for easy cleaning**



OV-330

DESIGN

Exterior. The exterior of the oven is easily cleaned and is finished in a hard light-grey stoved enamel. The door gasket is of woven fibre and the door is provided with a plugged hole for fitting a dial temperature indicator OV-178. The adjustable door catch enables the door to be opened and closed easily but, being spring-loaded, holds the door firmly when shut.

Interior. The oven liner is of corrosion resistant, semi-polished stainless steel to BS 971, EN 58B with fixed shelf runners and a removable baffle at the rear which guards the fan and heaters. There are no electrical connections within the working space. Since there are no inlets in the base the controls and circuits are protected from spillage.

Heating and Air Circulation. Air drawn from the centre of the oven is recirculated to the top and bottom of the workspace by a rear mounted fan. The heater, which is sheathed in stainless steel, surrounds the fan and is shielded from the workspace by the baffle. The fan motor has bearings which require no lubricating.

Ventilation. An adjustable ventilator in the top of the oven may be opened to allow air drawn in by the fan to flow through the oven for fume or moisture extraction or be closed when ventilation is not required. The ventilator incorporates a clip to hold a mercury in glass thermometer and may be lifted out to provide a 2·8 cm dia. aperture for cables, tubing, etc.

Shelves. The grid steel wire shelves are electroplated with chromium and nickel.

Basket shelves with grid sides 7 cm high are available as optional extras. These are of similar construction and finish to the ordinary shelves and slide directly on to the shelf runners. They are convenient for pre-loading of small articles which can then be inserted quickly into the oven with minimum heat loss.

For additional information see overleaf.

Gallenkamp BS OVENS, 300°C

(continued)

Temperature Control. Temperature is accurately and reliably controlled by a *Gallenkamp* direct reading *Compenstat* (solid state) thermostat. This has two continuously variable direct reading temperature scales ranged 40–170°C and 160–300°C. It also has three pre-set controls, two of which are in the range 60–170°C and the third 170–280°C, which can be pre-set by the user to temperatures most commonly required. The range controls and the pre-set controls are selected by push-buttons on the control panel. An indicator lamp lights when the oven reaches set temperature.

For additional security of oven contents, a safety thermostat is fitted which, in the event of incorrect setting or failure of the electronic controller, takes over and maintains the oven at a higher temperature (with a larger temperature differential). Under these circumstances a warning lamp indicates that the safety thermostat has taken over control.

PERFORMANCE

For definitions of terms see page 485.

Size No.	1	2
At 200°C		
Temperature fluctuation	0·1	0·1degC
Temperature variation	2·0	4·0degC
Heating time to stability	45	60 min
Recovery	6	8 min
Ventilation rate	2000	2000 l/hr
At 300°C		
Temperature fluctuation	0·1	0·1degC
Temperature variation	4·0	7·0degC
Heating time to stability	60	75 min
Recovery	20	20 min

DIMENSIONS

Size No.	1	2	
	H W D	H W D	
Internal	46×40×36	61×51×46	cm
Overall	81×58×71	96×68×81	cm
Shelves			
Size (net usable)	38×34	48×44	cm
Number supplied	3	3	
Number of positions	4	5	
Interval between positions	11	11·5	cm
Basket shelves			
Size, internal	7×33×33	7×43×43	cm
Weight, net	57	79	kg
Power rating, max.	1·5	2·0	kW

OV-330

OVENS, BS, *Gallenkamp*, **fan convection, 300°C max.,** as specification, to BS 2648 and BS 3421. With stainless steel interior, direct reading *Compenstat* (solid state) thermostat and independent safety thermostat. Fitted with load indicator and safety thermostat takeover indicator lamps and supplied with shelves. **Without thermometer.** For single phase supplies.

Size No.	1	2	
For 220/240V 50 Hz	£194·00	218·00	*bx*
For 200/210V 50 Hz	£208·00	253·00	*bxN*
For 110/120V 60 Hz	£208·00	253·00	*bxN*

OV-335

OVENS, BS, *Gallenkamp*, as OV-330 but **with double glazed window** 25×25 cm fitted in the door. For single phase supplies.

Size No.	1	2	
For 220/240V 50 Hz	£224·00	248·00	*bx*
For 200/210V 50 Hz	£238·00	283·00	*bxN*
For 110/120V 60 Hz	£238·00	283·00	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

OV-340 **Heaters.**

Oven Size No.	1	2	
Each	£4·20	4·20	*bx*

OV-172	**Motor**	For prices see entries in List No. sequence.
OV-174	**Shelves**	

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

ACCESSORIES

OV-176	**Basket shelves**	For details and prices see entries in List No. sequence.
OV-178	**Dial temperature indicator,** door fitting, range 0 to 300°C	
TJ-060	**Thermometer,** range 0 to 360°C, to fit top ventilator clip	
TJ-170	**Thermometers,** ranges up to 260°C as selected, to fit top ventilator clip...	
TJ-264	**Thermometer,** range 245 to 305°C, to fit top ventilator clip	

For suitable **FLOOR STANDS** see **OV-480** and **OV-482** in List No. sequence.

Gallenkamp OVEN/STERILISER, 250°C

A large capacity modern sterilising oven scientifically designed to conform to the performance requirements of BS 3421 'Performance of Electrically Heated Sterilising Ovens'.

- **Accurate temperature control by direct reading *Compenstat* (solid state) thermostat**
- **Safety thermostat for additional protection**
- **Capacity 210 litres**
- **Fan convection ensures temperature uniformity even at full load**
- **Stainless steel interior designed for easy cleaning**

DESIGN

The interior of the oven is of corrosion resistant EN 58B stainless steel, with 6 fixed shelf runners to accept both the nickel chromium plated steel wire grid shelves and OV-176 Size No. 3 basket shelves. Interval between shelf positions is approximately 12 cm. The door is fitted with a woven fibre gasket, an adjustable light-action door catch and a plugged hole to accept a dial temperature indicator OV-178.

OPERATION

Temperature control. Temperature is accurately and reliably controlled by a *Compenstat* (solid state) thermostat which is direct reading over the temperature range of the oven. An indicator lamp lights when the oven reaches set temperature.

In addition a safety thermostat is fitted which may be set to any desired interval above the oven operating temperature. In the event of incorrect setting or failure of the *Compenstat*, the safety thermostat takes over control and a warning lamp indicates the fault condition.

Air circulation and ventilation

A removable rear baffle provides ducted re-circulation of the air drawn in at the centre by the fan. The fan motor bearings require no lubricating.

An adjustable ventilator at the top of the oven regulates the passage of room air through the working space. The ventilator incorporates a thermometer clip and it may be lifted out to provide an aperture for tubing, wires, etc. There is no air inlet in the base of the oven and the controls are therefore protected from spillage.

PERFORMANCE when tested to BS 3421 methods at ambient plus 140degC. **For definitions of terms see page 485.**

Temperature drift during 2 hr period	0·5degC
Temperature variation	5degC
Heating time to stability	120 min

DIMENSIONS

	H W D
Internal	76×61×46 cm
Overall	112×79×81 cm
Shelves Size (net usable)	58×44 cm
Weight, net	102 kg
Power rating, max.	2·5 kW

Gallenkamp
OVEN

OV-420

OV-420

OVEN/STERILISER, *Gallenkamp*, **fan convection, 250°C max.,** as specification, to BS 3421. With stainless steel interior, *Compenstat* (solid state) direct reading thermostat and safety thermostat. Fitted with load indicator lamp, safety thermostat indicator lamp and 4 shelves. **Without thermometer.** For single phase supplies.

For 220/240V 50 Hz	Each	**£234·00**	*bx*
For 200/210V 50 Hz	Each	**£254·00**	*bxN*
For 110/120V 60 Hz	Each	**£254·00**	*bxN*

OV-425

OVEN/STERILISER, *Gallenkamp*, as OV-420 but **with double glazed window** 25×25 cm fitted in the door. For single phase supplies.

For 220/240V 50 Hz	Each	**£262·00**	*bx*
For 200/210V 50 Hz	Each	**£282·00**	*bxN*
For 110/120V 60 Hz	Each	**£282·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS AND ACCESSORIES

OV-430	Heater	Each £3·50 *bx*
OV-172	Fan motor	For full details and prices see entries in List No. sequence.
OV-174	Shelves, Size No. 3	
OV-176	Basket shelves, Size No. 3 ...	
OV-178	Dial temperature indicator...	
OV-484	Floor stand	

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

Gallenkamp MOISTURE EXTRACTION OVEN, 250°C

REGD TRADE MARK

A large capacity oven designed for the rapid, even drying of wet bulk laboratory and industrial samples such as sand, vegetable matter, tobacco, wood pulp, paper, etc.

- **Accurate temperature control by direct reading *Compenstat* (solid state) thermostat**
- **Safety thermostat for additional protection**
- **Capacity 210 litres**
- **Forced ventilation and large heater for rapid throughput of heated air**
- **Liner of corrosion resistant stainless steel to BS 971, EN 58B**

Gallenkamp
OVEN

OV-440

DESIGN

The interior of the oven is of corrosion resistant EN 58B stainless steel, with 6 fixed shelf runners to accept both the nickel chromium plated steel wire grid shelves and OV-176 Size No. 3 basket shelves. Interval between shelf positions is approximately 12 cm. The door is fitted with a woven fibre gasket, an adjustable light-action door catch and a plugged hole to accept a dial temperature indicator OV-178.

OPERATION

Temperature control. Temperature is accurately and reliably controlled by a *Compenstat* (solid state) thermostat which is direct reading over the temperature range of the oven. An indicator lamp lights when the oven reaches set temperature. In addition a safety thermostat is fitted which may be set to any desired interval above the oven operating temperature. In the event of incorrect setting or failure of the *Compenstat*, the safety thermostat takes over control and a warning lamp indicates the fault condition.

Air circulation and ventilation. A removable rear baffle provides ducted re-circulation of the air drawn in at the centre by the fan. The fan motor bearings require no lubricating.

The combination of the high powered heater and the mechanical ventilation system provides a rapid throughput of heated air. Provision is made for connecting the air outlet on the top of the oven to the duct of a moisture extraction system. An outlet adapter for 10 cm internal diameter ducting is supplied.

PERFORMANCE—unloaded oven at 110°C.

For definitions of terms see page 485.

Temperature fluctuation	1·0degC
Temperature variation	2·0degC
Heating time to stability	25 min
Maximum ventilation rate	36,000 l/hr

DIMENSIONS

	H W D	
Internal	76×61×46	cm
Overall	112×79×81	cm
Shelves		
Size (net usable)	58×44	cm
Weight, net	94	kg
Power rating, max.	2·75	kW

OV-440

OVEN, MOISTURE EXTRACTION, *Gallenkamp*, **fan convection and ventilation, 250°C max.,** as specification. With stainless steel interior, *Compenstat* (solid state) direct reading thermostat, safety thermostat, outlet adapter and 4 shelves. Fitted with load indicator and safety thermostat takeover indicator lamps. **Without thermometer.** For single phase supplies.

For 220/240V 50 Hz	Each	**£263·00**	*bx*
For 200/210V 50 Hz	Each	**£283·00**	*bxN*
For 110/120V 60 Hz	Each	**£283·00**	*bxN*

OV-445

OVEN, MOISTURE EXTRACTION, large capacity, *Gallenkamp*, as OV-440 but **with double glazed window** 25×25 cm fitted in the door. For single phase supplies.

For 220/240V 50 Hz	Each	**£291·00**	*bx*
For 200/210V 50 Hz	Each	**£311·00**	*bxN*
For 110/120V 60 Hz	Each	**£311·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS AND ACCESSORIES

OV-448	**Heater**	Each **£4·50** *bx*
OV-172	**Fan motor**	For full details and prices see entries in List No. sequence.
OV-174	**Shelves, Size No. 3**	
OV-176	**Basket shelves, Size No. 3** ...	
OV-178	**Dial temperature indicator**...	
OV-484	**Floor stand**	

When ordering replacement electrical parts please state Serial No. of oven and voltage and frequency of supply.

Gallenkamp OVEN AND INCUBATOR STANDS

REGD TRADE MARK

A range of rigid steel floor stands designed to provide a comfortable working height for *Gallenkamp* ovens and incubators. With fixed support platform and convenient undershelf for samples, etc.

Supplied in pre-pack with instructions for assembly.

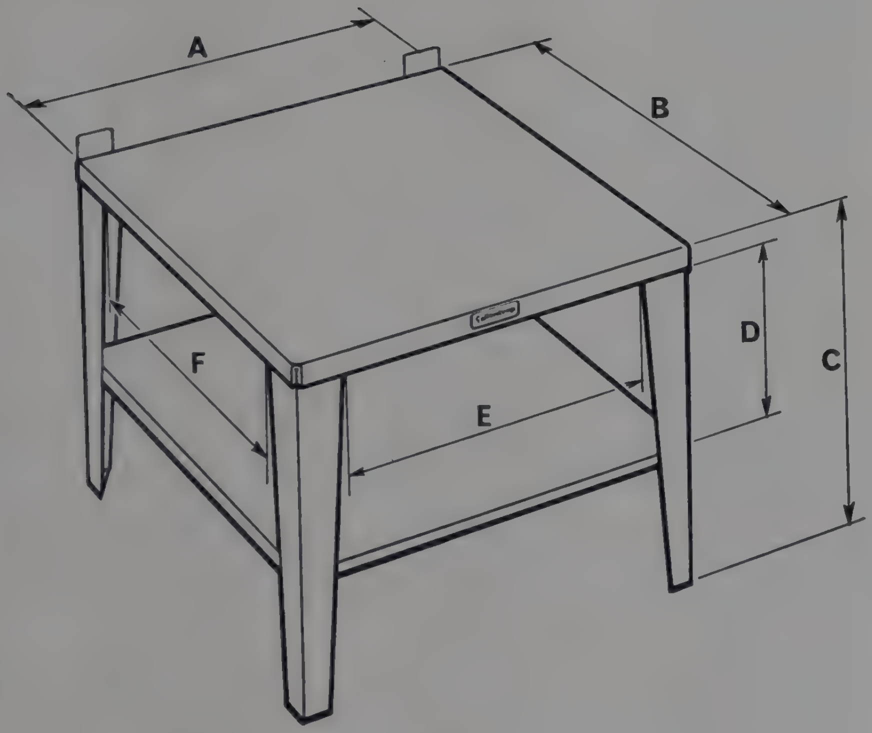
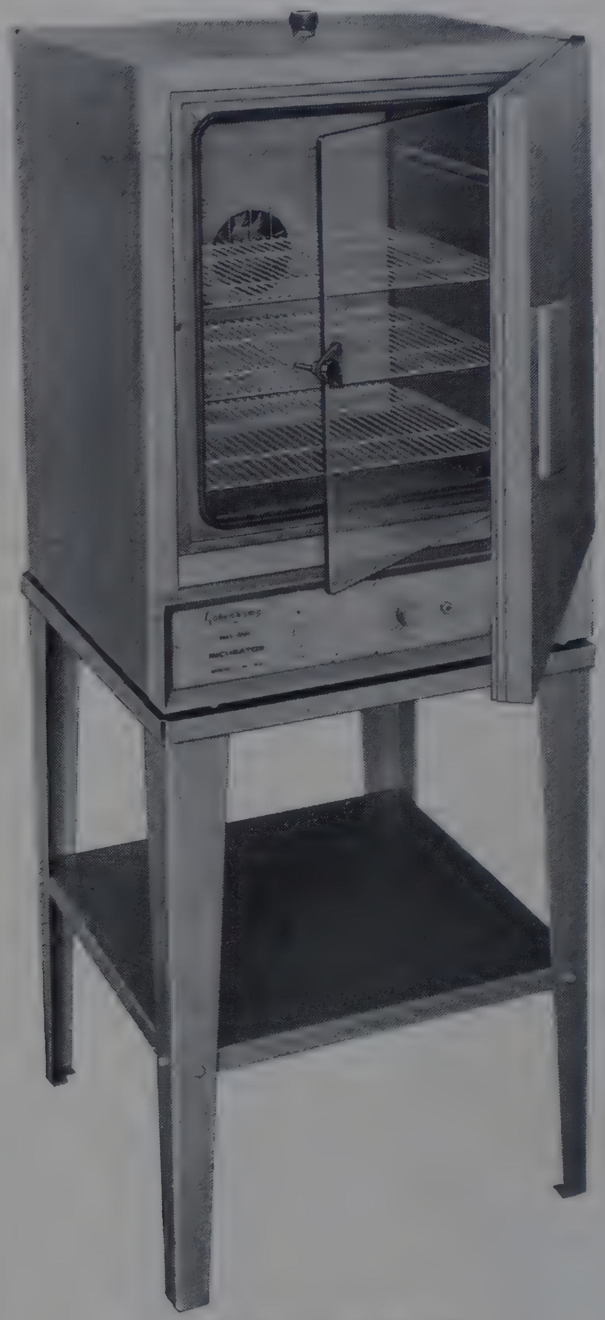


Fig. 1



IH-100 with OV-480

List No.	Suitable for		Dimensions (refer to Fig. 1)						Each	
	List No.	Size	A	B	C	D	E	F		
OV-480	IH-100	No. 1	57	57	70	36·5	40	40 cm	£ 20·00	bx
	OV-060 and OV-062									
	OV-160 and OV-165	No. 1								
	OV-330 and OV-335	No. 1								
OV-482	IH-100	No. 2	67	67	63·5	34	51	51 cm	21·50	bx
	IH-150	Nos. 1 and 2								
	OV-010	Nos. 1 and 2								
	OV-160 and OV-165	No. 2								
	OV-330 and OV-335	No. 2								
OV-484	IH-100	No. 3	77	67	56	29	62	51 cm	23·00	bx
	OV-160	No. 3								
	OV-165	No. 3								
	OV-420 and OV-425									
	OV-440 and OV-445									
	OV-620									

Gallenkamp NON-INJECTION HUMIDITY OVEN, 60°C

WITH SALT TRAY HUMIDIFIER

APPLICATIONS

Conditioning samples prior to electrical or mechanical tests.

Absorption and permeability measurements on packaging and other materials.

Shelf life tests on components packaging, etc. under simulated temperate or tropical conditions.

Corrosion tests on mechanical assemblies.

Gallenkamp
HUMIDITY
OVEN

OV-620

- Humidity control by saturated salt solutions
- Accurate temperature control by direct reading *Compenstat* (solid state) thermostat
- Safety thermostat for additional protection
- High level controls unaffected by spillage
- Fan convection ensures temperature and humidity uniformity
- Built-in cooling coil and solenoid valve
- Stainless steel liner and shelves
- Glass inner door for observing samples
- Water tight rim seal on inner door

PERFORMANCE

Temperature range	approx. ambient to 60°C
Temperature variation	±0·5degC
Temperature fluctuation	±0·1degC
Drift over 72 hours	not more than 1degC or 2% r.h.
Reproducibility	±0·5degC and ±2% r.h.
Recovery time at 60°C	30 minutes
Humidity range	0 to 95% r.h. at all temperatures

DIMENSIONS

	H W D
Internal	68×61×46 cm
External	112×79×79 cm
Shelves	
Number supplied	3
Number of positions	5
Interval between positions	12 cm

The removable base can be used as a shelf

Weight, net	100 kg
Power rating, max.	1 kW

Approximate weight of salt required for salt tray 3 kg.

For suitable **FLOOR STAND** see **OV-484** in List No. sequence.

Gallenkamp NON-INJECTION HUMIDITY OVEN

DESIGN

Exterior

The exterior surfaces of the oven are finished in a light grey stoved enamel which is easily cleaned. The outer door is fitted with a magnetic gasket seal.

Interior

The oven liner is of corrosion resistant stainless steel to BS 971 EN 58B. All seams are welded.

Five fixed shelf runners are fitted to the liner and, at the rear, a removable stainless steel baffle guards the heater, fan and cooling coil and provides ducted air circulation through the oven working space.

The bottom shelf is a plain sheet of stainless steel and serves to guide the ducted air between itself and the tray containing salt solution situated beneath it. Exchange of moisture between the solution and the circulating air produces rapid equilibrium of oven humidity.

Other shelves are of perforated stainless steel to allow a flow of air throughout the working space.

An inner glass door is fitted to permit viewing of samples under test without upsetting the humidity of the interior. The rim of this inner door has a moisture tight seal and a low power subsidiary heater to minimise condensation on and around the door. A trough with drain tube collects any drips which may fall when the glass door is opened.

Insulation

The space between the outer case and the liner is lagged with a closed cell polyurethane foam insulation, formed *in situ*. This insulation adds to the robustness of the overall design and forms a seal to prevent seepage of corrosive salt solutions and water vapour to the outer case should the liner be accidentally punctured.

The outer surfaces of the liner are coated with a polyurethane compound which bonds with the insulation to ensure a high degree of sealing.

Temperature control

Temperature is controlled by a direct reading *Compenstat* (solid state) thermostat and an independent safety thermostat is fitted. A stainless steel sheathed heater mounted round the motor driven fan ensures rapid temperature response and minimum fluctuation. An indicator lamp, which lights when the oven reaches set temperature, a mains switch and a safety thermostat takeover indicator lamp are fitted.

All controls and circuitry are housed at the top of the oven and are therefore protected from spillage of water or salt solutions.

A cooling coil and solenoid valve are incorporated for use when tests are to be carried out at or near ambient temperature. When switched into operation, the solenoid valve shuts while the heater is at maximum power and opens when heater power reduces to a level where cooling is required. This alternating system conserves water and reduces drift in operating temperature should the temperature of the cold water supply vary. At higher operating temperatures, the solenoid valve can be switched out of operation.

Humidity control

Humidity control is based on the fact that the relative humidity of air in contact with saturated salt solutions reaches known equilibrium values at given temperatures. The large area salt tray and the circulating air ensure that the atmosphere within the oven reaches equilibrium rapidly.

OV-620

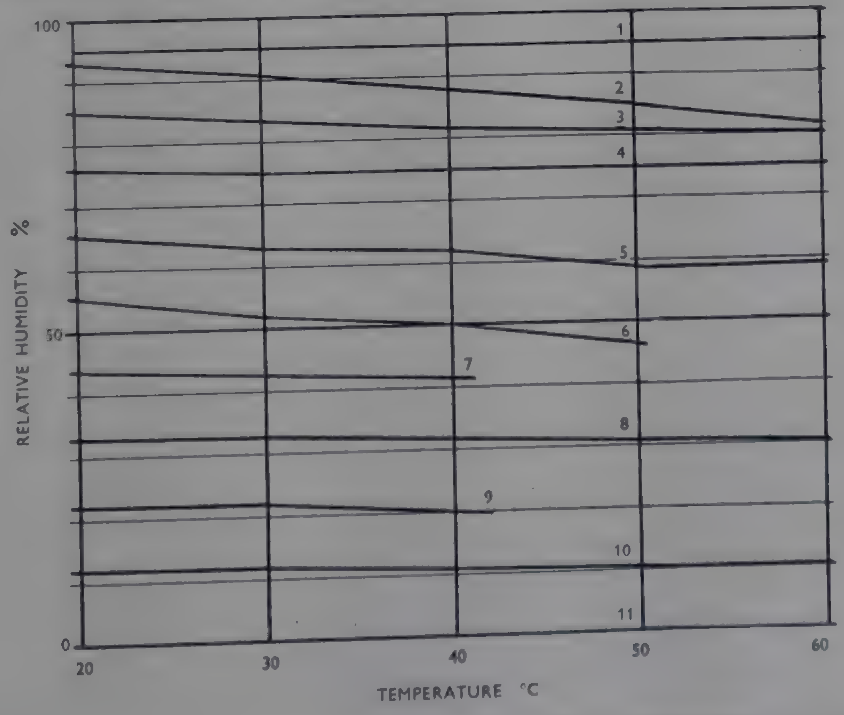
HUMIDITY OVEN, NON-INJECTION, 60°C max., *Gallenkamp*, as specification. With *Compenstat* (solid state) thermostat, independent safety thermostat, cooling coil, solenoid valve, stainless steel liner, 3 perforated shelves, base-shelf, polypropylene salt tray and inner glass door. For single phase a.c. supplies.

For 220/240V 50 Hz	Each	**£520·00**	*bx*
For 200/210V 50 Hz	Each	**£525·00**	*bxN*
For 110/120V 60 Hz	Each	**£530·00**	*bxN*

REPLACEMENT PARTS

OV-625	**Salt tray,** polypropylene	Each	**£6·50**	*bx*
OV-627	**Shelf,** perforated stainless steel ...	Each	**£7·25**	*bx*
OV-170	**Heater,** 1 kW, Size No. 1. For price see entry in List No. sequence.			

TEMPERATURES AND RELATIVE HUMIDITIES NORMALLY ATTAINABLE IN 20°C AMBIENT TEMPERATURE



Material to be placed in tray to obtain indicated values of relative humidity shown in graph on left.

Curve No.	Material
1	Distilled water
2	Potassium nitrate—saturated solution
3	Potassium chloride ,, ,,
4	Sodium chloride ,, ,,
5	Sodium nitrite ,, ,,
6	Sodium dichromate ,, ,,
7	Potassium carbonate ,, ,,
8	Magnesium chloride ,, ,,
9	Potassium acetate ,, ,,
10	Lithium chloride ,, ,,
11	Silica gel—dried.

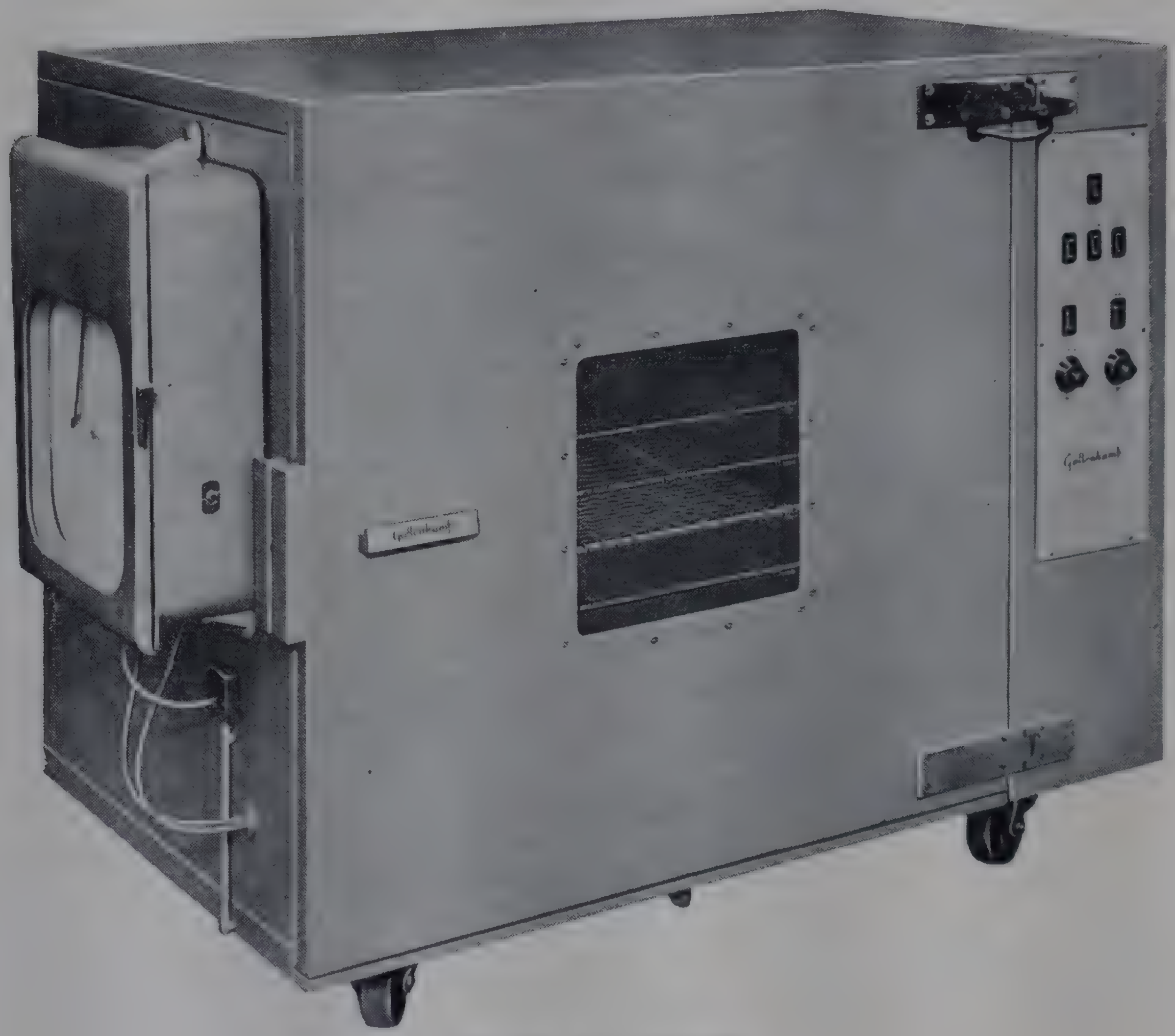
For details of salts suitable for other relative humidities see:—
Journal of Scientific Instruments **25,** 1948, 73.
Measurement of Humidity, Notes on Applied Science No. 4, HMSO.

Gallenkamp HUMIDITY OVEN, 100°C

WITH STEAM INJECTION HUMIDIFIER TO BS 3898 'LABORATORY HUMIDITY OVENS (INJECTION TYPE)'

For climatic and durability tests of electrical and electronic apparatus materials and components, for accelerated weathering tests of surface coatings and packing materials, for simulated tropical and extreme tropical conditions and for various botanical and zoological investigations.

- **Temperature control to within ±0·5degC**
- **Insulated stainless steel humidity chamber**
- **Air circulation by powerful centrifugal fan**
- **Up to nearly 100% humidity at all operating temperatures**
- **Welded steel outer case with castors for easy movement**
- **Adjustable safety thermostat**



OV-700 with OV-780

Suitable for many of the dry heat, damp heat, tropical exposure and life tests specified in the following standard test methods:

BS 2011	Basic climatic and durability tests for components for radio and allied electronic equipment
DEF 133	Climatic, shock and vibration testing of service equipment.
DEF 1234	General requirements for packaging supplies for the services.
DEF 5011	Climatic and durability testing of service electronic components.
DTD 919B	Electroplating of aluminium, steel and copper with silver and nickel.
DTD 1085C	Climatic testing of airborne instruments and equipment.
DTD 1086C	Climatic testing of ground instruments and equipment.
IEC 68, 2nd Edition	Basic environmental testing procedures for components for electronic equipment.
ISAT	Intensified standard alternating trials, series A & B.
K 114, Issue 2	Climatic and durability testing of service telecommunication equipment.
K 1007, Issue 3	Semiconductor devices.
MIL-E-5272C	Environmental testing of aeronautical and associated equipment.
MIL.STD.202B	Methods 103 and 106.
RCS 11, Issue 5	Climatic and durability testing of service electronic components.
RIC 11	Climatic and durability tests for components for radio and other electronic equipment.

Gallenkamp HUMIDITY OVEN

REGD TRADE MARK

PERFORMANCE AND CONSTRUCTION OF BASIC HUMIDITY OVEN

Humidity chamber

Constructed from stainless steel and insulated with glass fibre, the humidity chamber is fitted with runners for two 2·4 cm grid wire shelves. Circulating air is ducted across the heater to top and bottom of the chamber. For rapid, accurate response, the bulbs of the controlling contact thermometers are placed close to the fan, within the air duct. Drainage is provided for accumulated condensate.

The door is fitted with a heated, double glazed window 30×30 cm for viewing of samples under test. The door closes to make the whole chamber substantially airtight.

Control equipment

A lift-out end panel permits easy access to all control equipment and circuits including the connections to the front panel controls.

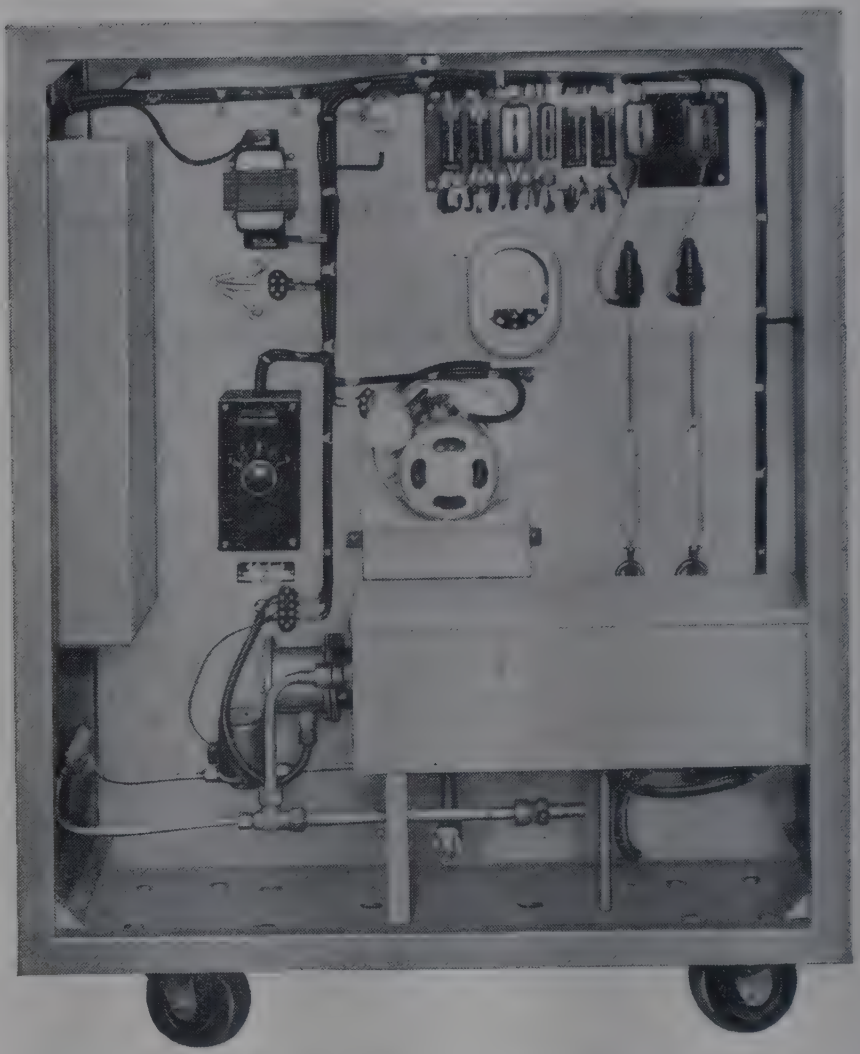
(1) Temperature control systems

Oven temperature is controlled to ±0·5degC by means of the dry bulb contact thermometer. Protection from overheating is provided by an adjustable snap-action safety thermostat which can be preset in the range 20 to 100°C. The energy regulator in the heater circuit may be adjusted to provide the optimum average heating rate for the operating temperature.

(2) Humidity control systems

Humidity is controlled by a second contact thermometer, the bulb of which is sleeved with a cotton wick which dips into a constant level water trough. This wet bulb thermometer is set at a temperature less than the nominal oven temperature by the depression equivalent to the required relative humidity. It is not possible to state actual figures for the humidity regulation obtained, as the percentage variations depend on working temperatures, but the wet bulb depression can be maintained to 0·5degC or better, when the controls are correctly set. External conditions can effect the working conditions at the lower end of the temperature range. Provision is made to reduce the control sensitivity when wider range temperature cycling is required.

Steam is produced in a small boiler and is introduced near the fan to ensure that it is rapidly dispersed throughout the chamber. The boiler is fed with water from a constant level cistern and is heated by an immersion heater. An integral safety thermostat prevents damage in case of boiling dry. The system of direct steam injection is capable of giving practically 100% relative humidity at all temperatures. The minimum conditions obtainable depend on ambient humidity and temperature, but since the oven can be effectively sealed, low values of humidity can be obtained by using drying agents, the refrigeration accessory OV-850 or the air injection fan OV-845.



Control compartment of OV-700 with OV-810

DIMENSIONS

	H		W		D	
Dimensions, internal	71	×	81	×	68·5	cm
external	109	×	122	×	79	cm
Door opening	71	×	71 cm			
Weight, net			190 kg			
Power rating, max.			3 kVA			

For ordering specifications see overleaf.

Gallenkamp HUMIDITY OVEN AND ACCESSORY EQUIPMENT

OV-700

HUMIDITY OVEN, *Gallenkamp,* **100°C max.,** as specification. With stainless steel humidity chamber, wet and dry bulb contact thermometers, ducted centrifugal fan, steam injection system, sheathed heater, safety thermostat, condensate drain and heated double glazed window in door. **Without shelves.** For single phase supplies.

For 220/240V 50 Hz	Each	**£1463·00** *bxN*
For 200/210V 50 Hz	Each	**£1483·00** *bxN*
For 110/120V 60 Hz	Each	**£1483·00** *bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

OV-718 **Contact thermometer,** scale span 0 to 110°C in 1degC. Each **£14·60** *bx*

OV-722 **Insulating sleeve, PVC,** placed over the bulb of the contact thermometer to increase the differential to between 2 and 3degC ... ... Each **£0·35** *bx*

OV-724 **Wicks,** for thermometer OV-718. Pack of 10 **£0·80** *bx*

When ordering replacement parts please quote apparatus number and state voltage and frequency of supply.

TREATMENT OF WATER SUPPLY TO HUMIDITY OVEN

In hard water areas it is advisable to supply the boiler with deionised or distilled water to prevent the deposition of chalk.

ACCESSORIES

MISCELLANEOUS FITTINGS

OV-735

SHELF, wire mesh, two can be used in oven OV-700. Each **£25·00** *bx*

OV-740

EXTENSION LEGS, 30 cm long to raise the oven above the floor in order that a large drainage tray can be used in the absence of a suitable floor drain. Set of 4 **£32·00** *bx*

OV-765

PANEL WITH BUSHINGS, for making electrical connections to equipment inside the oven. Comprises a detachable metal panel 13×13 cm, fitted with four bushings rated at 5000V 30A, and suitable for frequencies up to 200 MHz ... ... Each **£36·00** *bxN*

No extra fitting charge is made if ordered with oven.

Note that other bushings can be fitted and that cables can alternatively be taken through the ventilation aperture.

OV-770

REMOTE CONTROL KNOB, for operating the controls of equipment under test inside the oven. Comprises an 8 mm diameter rod in a plain bearing fitted at one end with a control knob. The other end projects inside the oven and can be coupled through a suitable driving link to the equipment under test. Subject to considerations of the construction of the oven and the other accessories used, the control knob may be fixed to almost any part of the end wall opposite to the control compartment. Each **£4·00** *bxN*

No extra fitting charge is made if ordered with oven.

When ordering please state preferred location of knob.

HUMIDITY MEASURING AND RECORDING EQUIPMENT

OV-780

RECORDING HYGROMETER, *Bristol's,* wet and dry bulb with synchronous electric motor giving 24 hr rotation. The recorder charts are 30 cm diameter with range 0–100°C. Complete with water trough, piping for connecting trough to oven water system, wet bulb wick, mains cable and instructions ... ... Each **£189·00***mxN*

No extra fitting charge is made if ordered with oven.

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

OV-782 **Wicks,** for wet bulb ... ... Pack of 5 **£3·00** *bx*

HV-110

HYGROMETER, wet and dry bulb, scale span 0–100°C in 1degC. For full details and price see entry in List No. sequence.

TK-150

THERMOHYGROGRAPH, for daily recordings. For full details and price see entry in List No. sequence.

Gallenkamp HUMIDITY OVEN—ACCESSORY EQUIPMENT

(continued)

PROGRAMME CONTROL SYSTEMS

No extra charge is made for fitting these systems if they are ordered to be supplied with the oven. When ordering control systems please state voltage and frequency of supply.

■ SIMPLE TIME CYCLE CONTROLLER

Either or both air heater and boiler can be switched on and off at adjustable times. The oven can thus be cycled between controlled conditions and approximately ambient conditions once every 24 hours.

OV-805
TIME SWITCH, with 24 hour dial and one pair of contact arms ... ... Each **£21·00** *bx*

■ GENERAL PURPOSE PROGRAMME CONTROLLER

Provides the following programmes:

1. Continuous control by wet and dry bulb contact thermometers time switch and spray cooling inoperative.
2. As 1 but with time switch producing automatic cycling between controlled conditions and approximately ambient once every 24 hours.
3. As 2 but with water spray operating during cooling period.
4. Heating by boiler only with time switch producing automatic cycling between any temperature and approximately ambient temperature with near 100% r.h. throughout. Spray cooling inoperative.
5. Heating by air heater only and time switch producing automatic cycling between any temperature and approximately ambient once every 24 hours.

These programmes are suitable for general damp heat and simulated tropical exposure tests including the following standard methods:

Dry heat tests to: BS 2011, DEF 133, DEF 5011, DTD 1086C, RCS 11 and RIC 11.

Damp heat or accelerated damp heat tests to: BS 2011, DEF 133, DEF 5011, IEC 68, K 114, K 1007 method A, RCS 11 and RIC 11.

Humidity tests to: DTD 919B, MIL-STD-202B method 103A and MIL-E-5272C procedure 3.

Tropical exposure and life tests to: DEF 133, DTD 1085C, DTD 1086C, K 114 and RCS 11.

Other tests: K 1007 method B and MIL-E-5272C procedure 1.

OV-810
GENERAL PURPOSE PROGRAMME CONTROLLER, as specification including OV-840 water spray cooler, OV-805 time switch and 5-position switch. Each **£77·00** *bxN*

■ PROGRAMME CONTROLLER for K 1007 and MIL-STD-202

By the addition of an extra contact thermometer, a time switch with two contact arms, a water spray cooler, a relay and a switchbox, the oven can be made to reproduce automatically the cycle specified in specification K 1007 method C and MIL-STD-202B method 106A.

OV-817
PROGRAMME CONTROLLER K 1007 and MIL-STD-202B, as specification including additional contact thermometer, time switch, OV-840 water spray cooler, relay and switchbox ... ... Each **£88·00** *bxN*

OV-819
PROGRAMME CONTROLLER providing the combined facilities of the OV-810 general purpose programme controller, and OV-817 programme controller for K 1007 and MIL-STD-202B ... ... Each **£132·00** *bxN*

■ PROGRAMME CONTROLLER for ISAT test schemes

By the addition of extra contact thermometers, a 3-pole changeover time switch and selector switches the oven can be made to reproduce the A and B test schedules of the Ministry of Supply Intensified Standard Alternating Trials (ISAT).

OV-820
PROGRAMME CONTROLLER for ISAT test schedules as specification including contact thermometers, time switch and selector switches. Each **£161·00** *bxN*

REPLACEMENT PARTS

OV-830	**Thermometer,** fixed contact, 115°F ...	Each	**£7·80**	*bx*
OV-832	**Thermometer,** fixed contact, 167°F ...	Each	**£7·80**	*bx*

ACCESSORY

OV-834	**Recording hygrometer** as OV-780, but with 7 day chart	Each	**£189·00**	*mxN*

SPECIAL PROGRAMME CONTROL SYSTEMS

Control circuits for special programmes can be considered on receipt of full details of requirements.

Gallenkamp HUMIDITY OVEN—ACCESSORY EQUIPMENT

REGD. TRADE MARK

(continued)

ACCELERATED COOLING AND DRYING EQUIPMENT

OV-840

WATER SPRAY COOLER, for increasing the cooling rate of the oven and for maintaining saturated conditions during cooling periods. This accessory comprises an atomising spray connected to the water system through a filter and a solenoid valve which is controlled by the wet bulb contact thermometer. An isolating switch enables the oven to be used without spray cooling.
Each **£32·00** *bxN*

OV-845

AIR INJECTION FAN, for reducing the relative humidity in the oven rapidly and for maintaining relative humidities close to the theoretical minimum for the ambient conditions. A centrifugal fan blows room air into the control compartment. An isolating switch is fitted.
Each **£35·00** *bxN*

When ordering accessory equipment please state voltage and frequency of supply.

OV-700 with OV-850

REFRIGERATION EQUIPMENT

For operating the oven at temperatures below ambient or for dehumidifying. **The oven is not suitable for operation below 0°C.**

Ambient temperature °C	20	25	30	35	40	43
Minimum working temperature °C	0	3	6	9	11	13

The refrigerator is mounted on the top of the oven. In use it is run continuously and temperature control is provided by the dry bulb contact thermometer in conjunction with the oven heater. Excess pressure and overload protection devices are built in.

OV-850

REFRIGERATION EQUIPMENT, as specification, for operation in locations where the ambient temperature does not exceed 35°C ... ... Each **£365·00** *bxN*
No extra fitting charge is made if ordered with oven.

OV-852

REFRIGERATION EQUIPMENT, as specification, for operation in locations where the ambient temperature does not exceed 50°C ... ... Each **£387·00** *bxN*
No extra fitting charge is made if ordered with oven.

ULTRAVIOLET IRRADIATION EQUIPMENT

For simulating the weathering effect of sunlight ultraviolet under various conditions of temperature and humidity.

This powerful source of radiation comprises a high pressure mercury arc ultraviolet tube in a well ventilated housing, with an anodised aluminium reflector.

The radiation passes through a silica window which is sealed into the oven wall. The arc tube is a straight quartz tube, giving an effective arc 13 cm long. Provision is made for increasing the voltage supplied to the tube in order to maintain intensity as the tube ages.

SPECTRUM

The arc tube generates the characteristic high pressure mercury arc covering the spectrum range from approx. 185 nm. The ultraviolet radiation from the tube is 60W out of a total radiant emission of 250W. The intensity of radiation below 320 nm is approx. 430μW/cm^2 at a distance of 1 metre, measured without a reflector.

OV-860

ULTRAVIOLET IRRADIATION EQUIPMENT, as specification, with control unit. Total average consumption 550W. For 110/120 or 200/250V a.c. single phase supplies ... ... Each **£262·00** *gxN*

No extra fitting charge is made if ordered with oven.

REPLACEMENT PART

OV-866 Quartz tube ... ... Each £35·00 *gx*

Gallenkamp DRYING CABINET

REGD. TRADE MARK

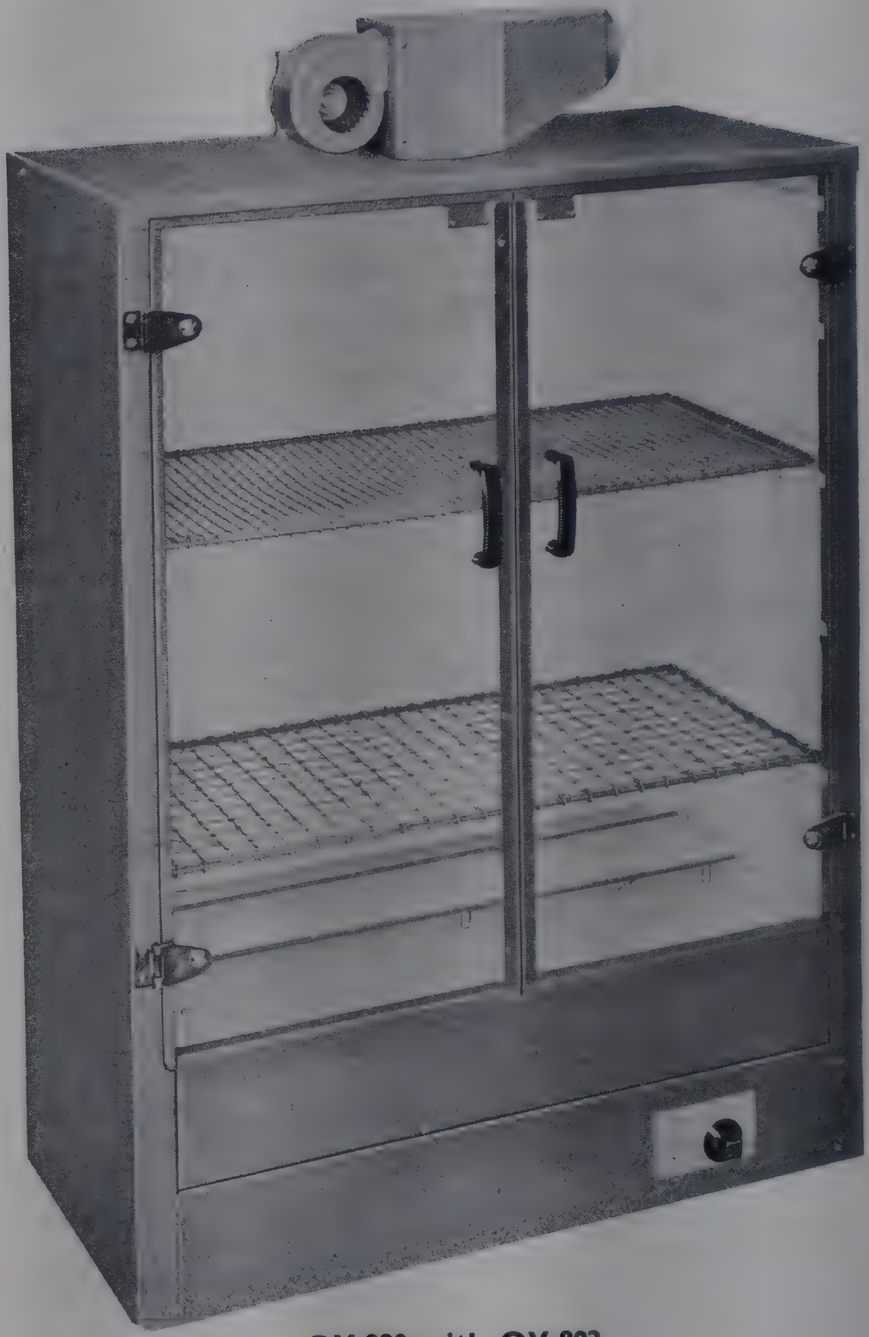
For rapid and controlled drying of glassware or chromatography paper up to sheet size 58 / 68 cm.

- **Maximum temperature 120°C**
- **Large capacity**
- **Toughened glass doors**
- **Temperature control by direct reading thermostat**

DESIGN

The heating elements, which are protected from spillage by baffles, are housed in the bottom compartment of the cabinet. Hot air convects rapidly through the cabinet interior and emerges through the adjustable ventilator at the top, carrying away with it moisture and other vapours.

The interior of the cabinet is lined with asbestos board insulation. Temperature is controlled by means of an hydraulic thermostat calibrated from 30 to 120°C in 5degC subdivisions. The indicator lamp shows when the heater is on.



OV-880 with OV-892

PERFORMANCE

Temperature fluctuation	±3degC
Temperature variation	8degC
Time to heat to 100°C	30 min
Power rating, max.	1·8 kW

DIMENSIONS

Shelves			
Dimensions	67 × 33 cm		
Number supplied	2		
Number of positions	4		
Interval between positions	15 cm		
Dimensions	H	W	D
Internal	72 ×	64 ×	37 cm
External	107 ×	76 ×	38 cm
Weight (net)	52 kg		

OV-880

DRYING CABINET, *Gallenkamp*, **120°C max.,** as specification, with direct reading hydraulic thermostat and load indicator lamp, toughened glass doors, adjustable ventilator, one each 12·5 and 25 mm wire mesh shelves. For a.c. single phase supplies.

For 220/240V	Each	**£132·00**	*bx*
For 200/210V	Each	**£134·00**	*bxN*
For 110/120V	Each	**£134·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

OV-884	**Heating element**	Each	**£3·40**	*bx*

When ordering replacement parts please state Serial No. of oven and supply voltage.

ACCESSORIES

OV-886	**Extra shelf,** 12·5 mm mesh	Each	**£2·60**	*bx*
OV-887	**Extra shelf,** 25 mm mesh	Each	**£2·60**	*bx*
OV-889	**Rack,** with clips for suspending six sheets of chromatography paper, to fit within the top of the cabinet.	Each	**£8·80**	*bx*
OV-890	**Extra clips,** for OV-889 ...	Pack of 12	**£4·10**	*bx*
OV-892	**Exhaust fan,** for fitting in place of the top ventilator to increase the rate of removal of moisture or fumes. Its outlet, which is suitable for connecting to ducting of extraction systems, takes 76 mm bore tubing. For single phase supplies only.			
	For 200/250V 50 Hz	Each	**£32·50**	*bx*
	For 110/120V 60 Hz	Each	**£33·50**	*bxN*

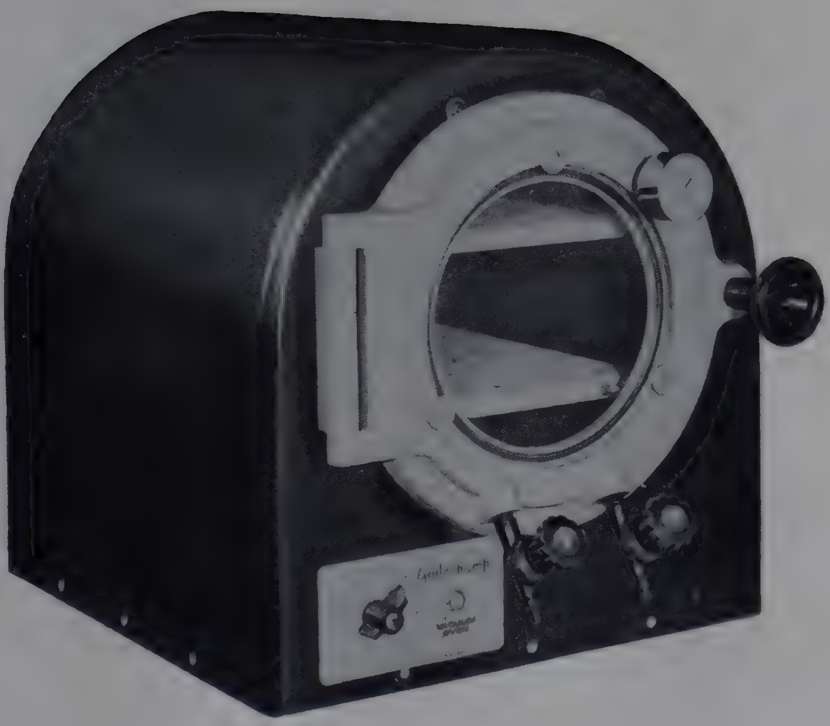
When ordering please state voltage and frequency of supply.

Gallenkamp VACUUM OVENS, 150°C

REGD. TRADE MARK

For accelerated batch drying or for preventing decomposition of heat sensitive materials without loss of drying speed. With uses in chemical, biological, pharmaceutical and other fields.

- **Temperature control within 0·5degC**
- **Two sizes available**
- **All controls built-in**
- **Diaphragm vacuum valves**
- **Glass fibre reinforced plastics case**
- **Safe, reliable operation**



OV-930

DESIGN

The oven comprises an anodised aluminium alloy vacuum chamber with a self-aligning door fitted with an observation window. Surrounding the chamber is a glass reinforced plastics outer case which remains cool at operating temperatures.

A thermometer, range 30 to 150°C, is fitted below the lower shelf and is visible through the window.

Heating is by built-in heaters controlled by a direct reading thermostat. A load lamp indicates when the heaters are energised.

To leave the vacuum chamber free from obstruction, the vacuum fittings are all mounted on the door. They comprise a vacuum dial gauge and two diaphragm valves with insulated handles which remain cool at operating temperatures. The valves are for vacuum line connection and air bleed respectively and the nozzles of both point downwards to avoid kinking of flexible connecting tubes. The nozzles are serrated and accept 6·5 mm bore vacuum tubing.

PERFORMANCE

Size No.	1	2
Temperature range	ambient+5degC to 150°C	
Time to heat to 150°C	45 min	60 min
Temperature fluctuation	within 0·5degC	
Vacuum and gauge range	0–760 mm Hg	

DIMENSIONS

	1	2	
Number of shelves	2	2	
Shelf dimensions	25×30	33×45	cm
Distance between shelves	12	14	cm
Internal dimensions			
Diameter	30·5	37	cm
Maximum depth	32·5	50	cm
External dimensions	H W D	H W D	
	50×47×57	63×56×68	cm
Power rating, max.	800W	1150W	
Weight, net	28	44	kg

OV-930

OVEN, VACUUM, *Gallenkamp*, **150°C max.,** as specification, with glass reinforced plastics outer case, direct reading thermostat and heater load indicator lamp, door with observation window, mercury in glass thermometer, vacuum dial gauge and two diaphragm vacuum valves. Supplied with two shelves.

Size No.		1	2	
For 220/240V a.c.	Each	**£152·00**	**245·00**	*gx*
For 200/210V a.c.	Each	**£155·50**	**249·00**	*gxN*
For 110/120V a.c.	Each	**£155·50**	**249·00**	*gxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

OV-932	**Thermometer,** range 30 to 150°C ...	Each	**£1·60**	gx
OV-934	**Door gasket,** for size 1 oven	Each	**£6·80**	gx
OV-936	**Door gasket,** for size 2 oven	Each	**£8·00**	gx

ACCESSORIES

TX-755	**Tubing,** neoprene, heavy wall, H6·5	For details and prices see entries in List No. sequence.
VB-104	**Vacuum pump**	

GRAPH PAPERS

The following are ruled on size A4 (210×297 mm) creme wove paper.

PB-880
GRAPH PAPER, linear cm and mm ruling. Ruled area 190×280 mm printed one side only in blue with plain margins. Pad of 50 sheets.
Ten pads **£3·70** Pad **£0·43** *mx*

PB-884
GRAPH PAPER, logarithmic 3 cycle/mm ruling. Ruled area 180×250 mm printed one side only in green with plain margins. Pad of 25 sheets.
Ten pads **£4·50** Pad **£0·50** *mx*

PB-892
GRAPH PAPER, quadrille 5 mm ruling. Ruled to the edges on both sides in grey. Pad of 50 sheets.
Ten pads **£3·70** Pad **£0·43** *mx*

GRAPH NOTEBOOK

PB-910
GRAPH NOTEBOOK, 80 pages, size A4 (210×297 mm). With linear graph ruling in cm and mm on left-hand pages and ruled feint with margin on right hand pages. All rulings in blue. Semi-stiff cover.
Ten **£2·50** Each **£0·31** *mx*

GLAZED SAMPLING PAPER

PB-980
PAPER, GLAZED SAMPLING, black, carton of 25 sheets, 50×38 cm. 10 cartons **£11·00** Carton **£1·25** *cx*

PB-982
PAPER, GLAZED SAMPLING, white, carton of 25 sheets, 50×38 cm. 10 cartons **£11·00** Carton **£1·25** *cx*

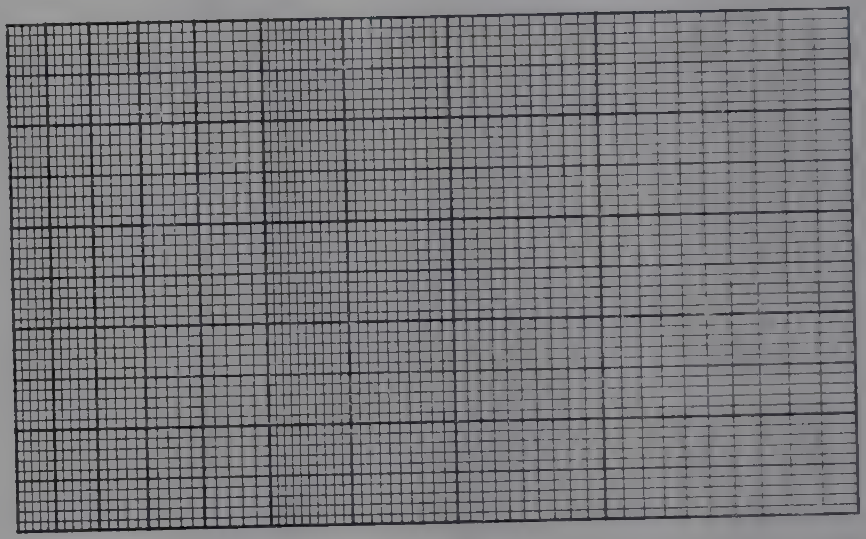
PLASTICS BACKED PAPER

PB-990
PAPER, ABSORBENT, *Benchkote*, backed with polythene film to prevent liquids penetrating right through and to give the material wet strength and durability. Recommended as a disposable covering for benches, animal cages, humidity cabinets, etc. either to localise spillage or for the collection of falling particles. Particularly useful in radiochemical and bacteriological laboratories. Packet of 50 sheets 46×57 cm ... ... Packet **£2·40** *mx*

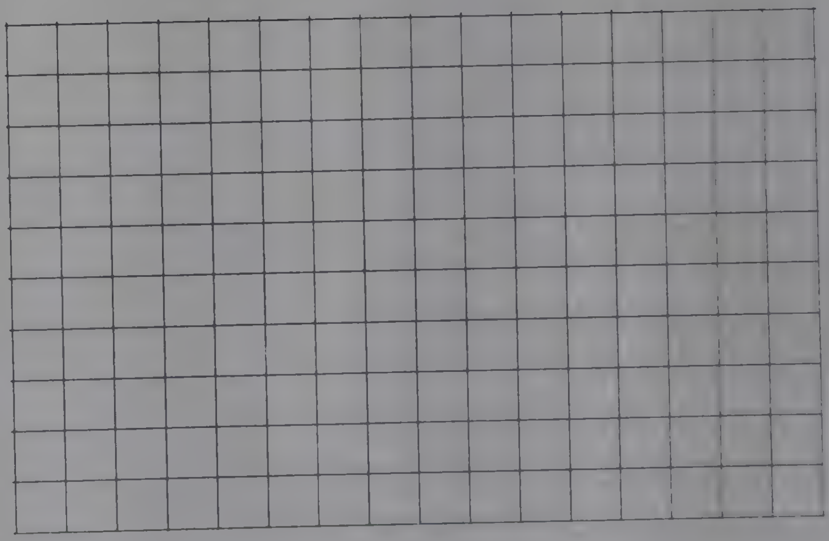
PB-991
PAPER, *Benchkote*, as above but supplied in 50 metre rolls.

Width	46	92 cm	
Roll	**£3·87**	**6·57**	*mx*

PB-880



PB-884



PB-892

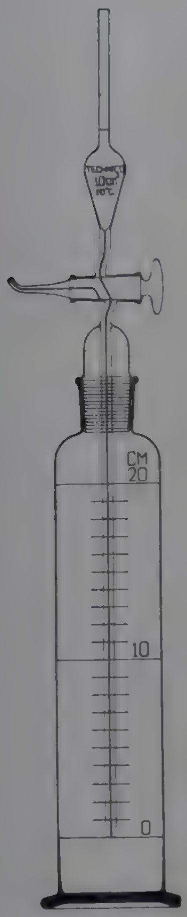
PAPER, asbestos	see ASBESTOS GOODS
,, , chromatographic	see CHROMATOGRAPHY
,, , filter	see FILTER PAPER
,, , litmus, etc.	see TEST PAPERS
,, , sieve analysis	see SIEVES

Technico ANDREASEN PARTICLE SIZE APPARATUS

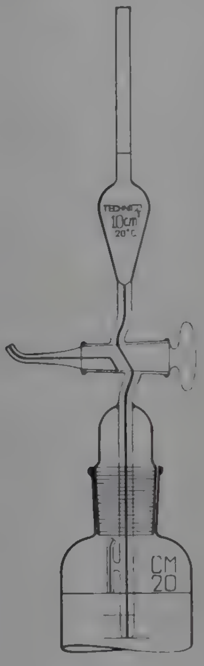
REGD. TRADE MARK

For the determination of particle sizes in materials such as clays, minerals, ceramics, pulverised fuel, cement, etc., by the pipette sampling method as specified in BS 3406 Part 2.

By agreement with Professor A. H. M. Andreasen of Copenhagen, we hold the sole rights of manufacturing and selling this apparatus in Great Britain, Northern Ireland, Eire, the Commonwealth, and North and South America.

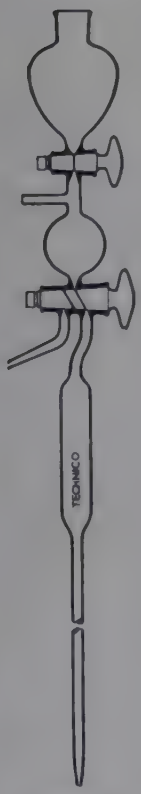


PC-550

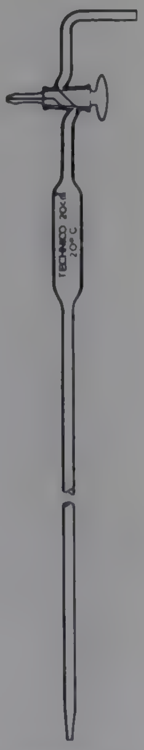


PC-555

PC-600



PC-610
PC-612



PC-615

Sieves for particle sizing see SE-045 et seq. in List No. sequence.

Operation

A weighed quantity of powder is shaken with a definite volume of water or other liquid in which it can be dispersed, so that a homogeneous suspension is produced. By means of the pipette, using the 2-way stopcock, 10 cm³ portions of the suspension are extracted from the bottom of the bottle after measured intervals of time, and are transferred to weighed dishes. The contents of the dishes are evaporated to dryness and weighed. Since the times taken by particles to fall through the test distance of 20 cm in the suspension depends on their sizes, the particle size distribution in the powder can be determined from the weights of residue and the elapsed times.

References

Measurements of the fineness of powdered materials, H. Heywood, Trans. Inst of Mech. Engineers, Dec. 1938.
Grain size of whiteware clays as determined by the Andreasen pipette, George A. Lomis, Jour., Amer. Ceramic Soc., **21**, 1938, No. 11.

PC-550

PARTICLE SIZE APPARATUS, Andreasen, *Technico*, as specification, with bottle graduated 0 to 20 cm and standard 10 cm³ pipette ... ... Each **£8·55** *ax*

REPLACEMENT PARTS

PC-552	**Bottle,** graduated 0–20 cm, 29/32 socket.	Each	**£4·10**	*ax*
PC-553	**Pipette,** *Technico*, 10 cm³, 29/32 cone ...	Each	**£4·55**	*ax*

ACCESSORY

PC-555	**Pipette,** *Technico*, 10 cm³ modified. For use with exceptionally fine materials using sampling depth of 20 mm, 29/32 cone	Each	**£5·40**	*ax*

PARTICLE SIZE APPARATUS WITH VARIABLE SAMPLING DEPTH

To BS 812 and BS 1377

Based on the same principle as the Andreasen apparatus but designed so that samples may be withdrawn over a range of depths.
Comprises a tubular steel stand, with levelling feet and vertical slide having rack and pinion for height adjustment. A scale is fitted to the stand to indicate the movement of the slide. The slide is designed to hold the sampling pipettes listed below with sufficient room underneath for either a 500 cm³ or a 1000 cm³ cylinder containing the sample and, if required, a thermostatic water bath. The rack and pinion allow the pipette to be lowered into the sample and removed again smoothly without disturbing the sedimentation.

PC-600

PARTICLE SIZE APPARATUS STAND, *Gallenkamp*, as specification. **Without sampling pipette or cylinder to contain sample** ... ... Each **£27·00** *bx*

ACCESSORIES

PC-610	**Sampling pipette,** *Technico*, 25 cm³ to BS 812. Incorporating two stopcocks, suction bulb and reservoir.	Each	**£6·50**	*ax*
PC-612	**Sampling pipette,** *Technico*, 10 cm³ to BS 1377. Incorporating two stopcocks, suction bulb and reservoir.	Each	**£6·40**	*ax*
PC-615	**Sampling pipette,** *Technico*, 20 cm³, simple design incorporating single stopcock only ...	Each	**£3·05**	*ax*
CY-104	**Cylinders,** *Technico*, graduated, 500 cm³ and 1000 cm³, to hold samples	For details and prices see entries in List No. sequence.		
SU-760	**Stoppers** for above cylinders, size 41 and 53			

Gallenkamp SEDIMENTATION BALANCE

FOR PARTICLE SIZE DETERMINATION IN THE RANGE 5 to 75 μ

British Patent No. 712,434. U.S. Patent No. 2,699,673.
IN ACCORDANCE WITH BS 3406 Part 2

Normally used for determination of particle size distribution within the range 5 to 75μ. Where, however, the largest size is not greater than about 20μ, the lower limit may be extended to about 2μ provided the temperature is controlled to within fairly narrow limits and neither agglomeration nor flocculation takes place.

Used successfully to analyse a wide variety of powdered materials including alumina, boiler and blast furnace dusts, carborundum, cement, china clay, flints, flour, limestone, metal sintering powders, paints and pigments, plastics materials and pyrites.

Devised by Mr. W. Bostock of the Research Department, Simon Carves Ltd.

Bibliography

Bostock, W. J.Sci. Inst. **29,** 1952, 209.
Cohen, L. Instrument Practice, **13,** 1959, 1036.
Kaye, B. H. Paint Oil and Colour Journal, July 1966, 212.
Kent-Jones, D. W. and Amos, A. J. Modern Cereal Chemistry 6th Ed., 1967, 192.

PC-650

SEDIMENTATION BALANCE, *Gallenkamp,* as specification, for particle size determination, complete with glassware, water jacket thermometer, mixing tube, plastics dust cover and full instructions for use and calculation of results. Requires, but does not include, a reliable 6V source (see BJ-162 or PC-669 below) to power the lamp which provides magnified read-out of the balance graticule.
Each **£424·00** *bx*

REPLACEMENT PARTS

PC-656	**Sample container,** with 29/32 socket...	Each	**£2·55**	*ax*
PC-658	**Stopper,** with 29/32 cone and stopcock.	Each	**£1·30**	*ax*
PC-660	**Sedimentation tube,** graduated ...	Each	**£3·15**	*ax*
PC-662	**Water jacket,** without gaskets ...	Each	**£1·70**	*ax*
PC-663	**Gasket,** top, for PC-662	Each	**£2·20**	*bx*
PC-664	**Gasket,** bottom, for PC-662	Each	**£2·20**	*bx*
PC-665	**Receiving tank**	Each	**£1·00**	*ax*
PC-666	**Torsion wire**	Each	**£8·15**	*bx*
PC-667	**Lamp,** 6V, 18W, S.B.C.	Each	**£0·90**	*mx*
PC-668	**Mixing tube,** borosilicate glass, with mark at 225 ml and 29/32 socket. Overall length 25 cm with gradual taper to 15 mm dia. at lower end for easy transfer of samples into sample container PC-656...	Each	**£2·05**	*ax*
TJ-380	**Thermometer** for water jacket, scale span 10 to 40°C For price see entry in List No. sequence.			

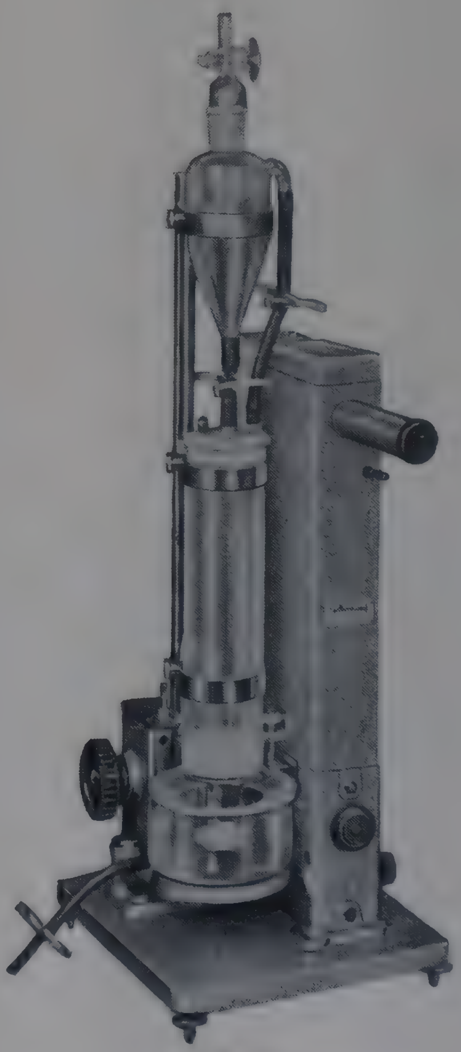
ACCESSORIES for supplying balance lamp

PC-669	**Transformer,** 6V, 18 VA, totally enclosed. Required for when mains electricity supply available. For 200/250V 50/60 Hz single phase supplies	Each	**£19·00**	*bx*
	For 100/110V 50/60 Hz single phase supplies.	Each	**£19·00**	*bxN*

When ordering please state voltage and frequency of supply.

BJ-162	**Accumulator,** 2V. Three required for when main electricity supply not available. For price see entry in List No. sequence.

- **Determination from 5μ to 75μ in 6 hours**
- **Requires about 0·5 g of sample**
- **Sensitive, robust torsion balance system**
- **Illuminated magnified read-out from torsion balance**
- **Design minimises errors due to buoyancy and particle collision**
- **High reproducibility**
- **Simple operation and maintenance**
- **Auto-recording accessory available**



PC-650

For auto-recording accessories see overleaf.

Gallenkamp SEDIMENTATION BALANCE

To determine the particle size distribution of a sample, a suspension is released from the pre-mixing vessel into the sedimentation column and balance scale readings are noted at times increasing by a factor of $\sqrt{2}$ up to 362 minutes 40 seconds.

RECORDING ATTACHMENT

Using the recording attachment, the sedimentation balance can be left unattended once the sequence of operations has been started. An electric timer module PC-682 automatically sends impulses to an auto 35 mm camera PC-684 at the correct time intervals, leaving a photographic record of readings which would otherwise be taken by the operator.

The method avoids interference with the delicate torsion balance and, using a changing bag PC-687 and a simple developing tank PC-688, a permanent record of readings can be produced within ten minutes of unloading the camera. A darkroom is not required for this processing.

PC-682

TIMER, *Gallenkamp*, as specification, for 200/250V 50 Hz single phase supplies only ... ... Each **£290·00** *bx*

***PC-684**

AUTO-CAMERA, as specification, with solenoid, cable release and take-up cassette ... ... Each **£165·00** *fx*

ACCESSORIES

PC-687 **Changing bag,** black plastics with welded seams. Each **£2·25** *fx*

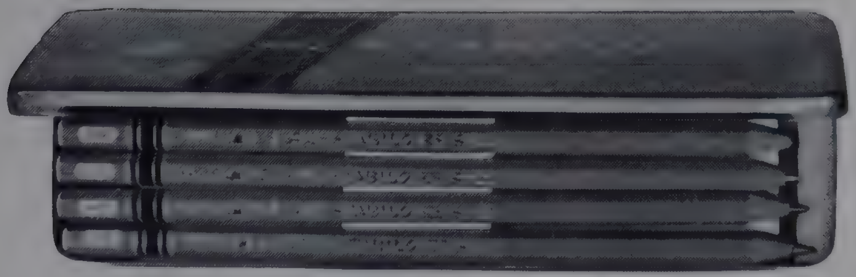
PC-688 **Developing tank,** 35 mm, for up to 1·5 m of film. Each **£1·50** *fx*

NOTE: A transformer PC-669 is required to supply the sedimentation balance lamp.

PENCILS

A. GALLENKAMP & CO. LTD.

PC-920



PC-940

PENETROMETERS see PETROLEUM
PESTLES see MORTARS and PESTLES
PETRI DISHES see CULTURE

PC-910

PENCILS, *Chinagraph*, for writing on glass and other polished surfaces. Available in brown, red, yellow, green, blue, or black. In boxes of 12 ... Box **£0·80** *cx*
When ordering please state colour required.

PC-920

COLLET HOLDER, *Chinagraph*. This holder will accept *Chinagraph* refills of 4 mm dia. up to 9 cm long and is economical in use as it avoids sharpening and wasted short ends. Holder only with pocket clip. Each **£0·65** *cx*

PC-922 **Refills,** *Chinagraph*, for pencil holder PC-920. Available in red, yellow, green, blue or black. In tube of 12 of one colour ... ... Tube **£0·30** *cx*
When ordering please state colour required.

***PC-940**

PENCIL, *All-Stabilo*, for writing on all surfaces including metal, glass, plastics and glossy paper. The opaque, matt black impression is waterproof but is removed easily by wiping with a damp cloth. In box of 12. Box **£1·00** *cx*

***PC-943**

PENCILS, *All-Stabilo*, as PC-940 but coloured. In set of 6 comprising one each red, yellow, blue, green, black and white. In plastics wallet... ... ... Set **£0·60** *cx*

GP-225 and GP-230

GLASS WRITING DIAMONDS. For details and prices see entries in List No. sequence.

PETROLEUM AND ALLIED PRODUCTS TESTING APPARATUS

This section mainly contains apparatus specified in Standard Methods for Testing Petroleum and its Products published by the Institute of Petroleum (IP). References to American Society for Testing Materials (ASTM) methods are made where the apparatus conforms to both specifications.

References are made also to various standards published by the British Standards Institution (BS) and Standard Tar Products Test Committee (STPTC) where these apply.

Apparatus supplied to a recognised standard will conform to the latest version of the standard, irrespective of our present catalogue specification. This policy will be adhered to rigidly unless we are definitely instructed to the contrary when apparatus is ordered.

To give the user the benefit of modern trends in design, we also reserve the right to depart from catalogue specifications by incorporating improvements which increase the convenience and usefulness of apparatus.

STANDARD METHODS

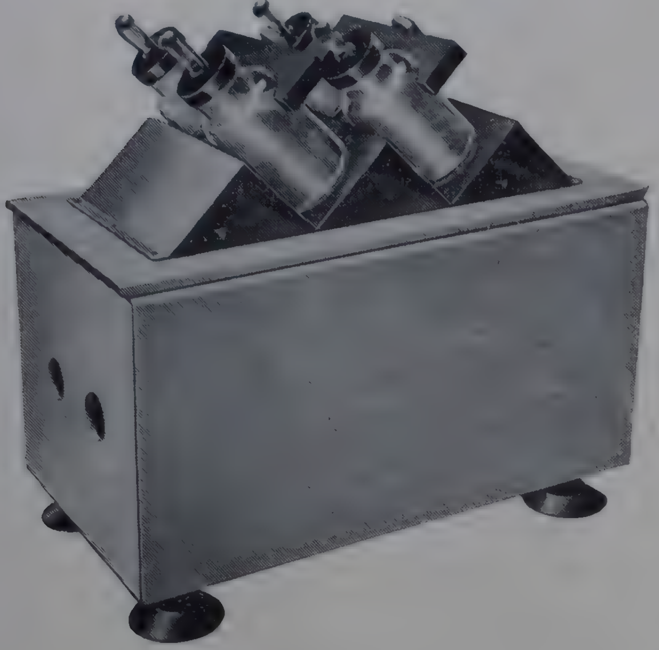
Listing code
IP 13 — D 189 indicates **ASTM—IP** joint methods.
IP 34 D 93 indicates technically equivalent methods.
IP 45 (D 6) indicates corresponding methods.

IP No.	ASTM No.	TITLE	PAGE
IP 12	(D 240)	Calorific value of liquid fuel	511
IP 14	— D 524	Ramsbottom carbon residue	511
IP 15	— D 97	Pour point	512
IP 16	— D 2386	Freezing point of aviation fuels	525
IP 23	— D 322	Dilution of gasoline engine crank-case oils	513
IP 24		Distillation of crude petroleum	520
IP 31		Drop point of grease	521
IP 33		Abel flash point	522
IP 34	— D 93	Pensky-Martens flash point (closed)	523
IP 35		Pensky-Martens flash point (open)	523
IP 36	— D 92	Cleveland flash point	522
IP 40	— D 525	Oxidation stability of gasoline	525
IP 49	— D 5	Penetration of bitumen	526
IP 50	— D 217	Penetration of grease	526
IP 53	— D 473	Sediment in crude and fuel oils	528
IP 57	(D 1322)	Smoke point	510
IP 58	(D 36)	Softening point of bitumen	521
IP 59		Specific gravity and density	528
IP 63	(D 1551)	Sulphur content—quartz tube method	529
IP 69	(D 323)	Vapour pressure—Reid method	530
IP 70		Viscosity—Redwood	534
IP 71	— D 445	Viscosity (transparent and opaque liquids)	531
IP 72		Viscosity—cutback bitumen and road oil	533
IP 74	— D 95	Water content—Dean and Stark method	513
IP 75	— D 1796 (D 96)	Water and sediment—centrifuge method	535
IP 77		Salt content—crude petroleum	527
IP 96	— D 526	Lead in gasoline	530
IP 107	— D 1266	Sulphur in petroleum products	529
IP 112		Corrosive substances in grease	513
IP 123	— D 86	Distillation of petroleum products	514/520
IP 131	— D 381	Existent gum in fuels	528
IP 132	— D 566	Dropping point of lubricating grease	521
IP 136	— D 94	Saponification number	527
IP 138	— D 873	Oxidation stability of aviation fuels	525
IP 143		Asphaltenes	510
IP 145	— D 1019	Olefinic plus aromatic hydrocarbons	510
IP 148	(D 1091)	Phosphorus in lubricating oil	527
IP 154	— D 130	Copper corrosion	513
IP 156	— D 1319	Hydrocarbon types in liquid petroleum	525
IP 161	D 1267	Vapour pressure	530
IP 167		Penetration of semi-fluid greases	526
IP 170		Flash point by the Abel apparatus	522
IP 179	— D 937	Cone penetration of petrolatum	526
IP 182		Acidity (inorganic) of petroleum products	530
IP 189	(D 941)	Specific gravity and density	528
IP 190	(D 70)	Specific gravity and density	528
IP 191	— D 216	Distillation of natural gasoline	520
IP 195	D 1078	Distillation range of volatile organic liquids	514/520
IP 196	— D 1500	Colour of petroleum products	512
IP 198	— D 2398	Softening point of asphalt (bitumen) and tar	521
IP 212		Viscosity—bitumen road emulsion	533
IP 219	— D 2500	Cloud point of petroleum oils	512
—	D 91	Precipitation number of lubricating oils	535
—	D 1321	Needle penetration of petroleum waxes	526
—	D 1403	Cone penetration of lubricating greases	527
—	E 133	Distillation equipment	572/576

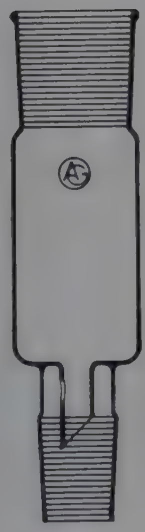
IP thermometers—see **Thermometers.**

STPTC No.	TITLE	
RT 2	Viscosity	533
RT 3	Equi-viscous temperature (e.v.t.)	532
V 4d	Separating funnel receivers	528
V 4e	Separating funnel receivers	528
V 12	Hubbard specific gravity bottle	528
V 14	Pyknometer	528

BS No.	TITLE	
188	Viscosity of liquids	531
434	Bitumen road emulsion	533
658	Distillation range	520
756	Dean and Stark apparatus	535
894	Ubbelohde apparatus	521



PE-124



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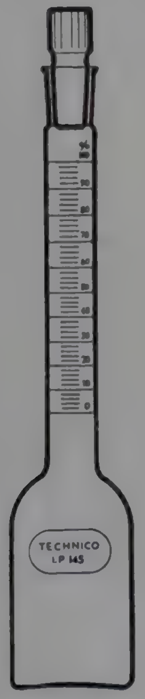

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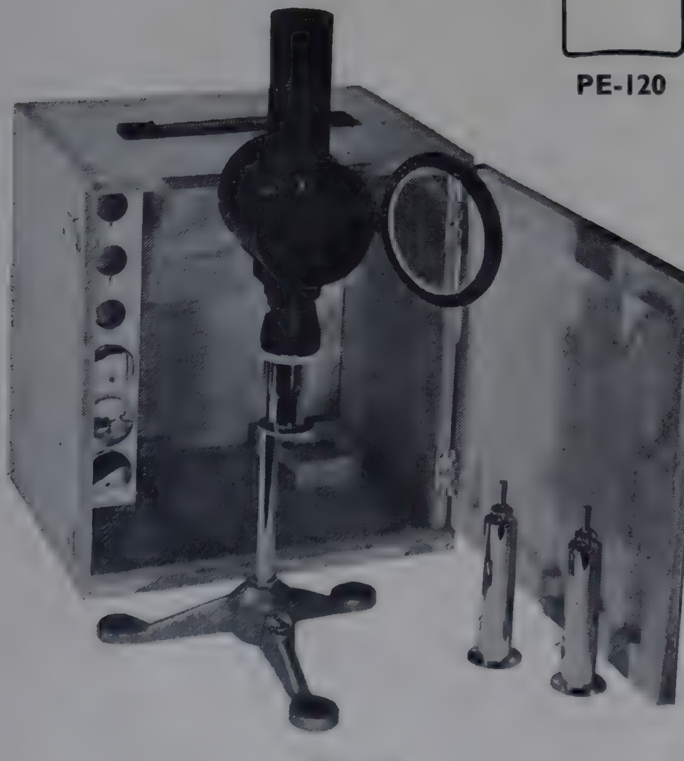


PE-170
PE-172

OLEFINIC PLUS AROMATIC HYDROCARBONS IN PETROLEUM DISTILLATES, ASTM D1019-IP 145

PE-120

SULPHONATION FLASK, *Technico*, standard, with ground stopper, capacity to zero graduation about 45 ml, neck graduated 0–100% in 2% divisions. Each **£1·70** *ax*

PE-124

SHAKING MACHINE, accommodates four standard sulphonation flasks in individual cooling jars. Flasks are mounted at an angle of 45° and shaken at 250 ±25 cycles/min with a horizontal stroke of approximately 7·5 cm. Supplied with four screw top cooling jars but **without sulphonation flasks.** For 240/250V 50 Hz single phase supplies ... ... Each **£150·00** *fxN*

PH-900 **Centrifuge,** for sulphonation flasks. For details and price see entry in List No. sequence.

ASPHALTENES—PRECIPITATION WITH NORMAL HEPTANE, IP 143

PE-140

EXTRACTOR, AG, borosilicate glass, with 24/29 cone and 34/35 socket ... ... Ten **£16·00** Each **£1·80** *ax*

BH-030 **Basin,** evaporating, capacity 100 ml
FJ-058 **Flask,** conical, borosilicate glass, 250 ml ... ...
Q-CX5/25 **Condenser, Davies,** double surface, borosilicate glass, 20 cm jacket with 34/35 cone ... ...
For details and prices see entries in List No. sequence.

SMOKE POINT OF JET FUELS ASTM D1322 SMOKE POINT, IP 57

PE-170

STANDARD LAMP, *Seta*, comprising lamp body, candle socket, candle, on stable tripod stand. The lamp body, enamelled matt black, has a polished black scale marked in white. The candle socket has a smooth height adjustment ... ... Each **£52·50** *fxN*

PE-172

CASE, to contain lamp assembly, tripod stand and five additional candles ... ... Each **£12·00** *fxN*

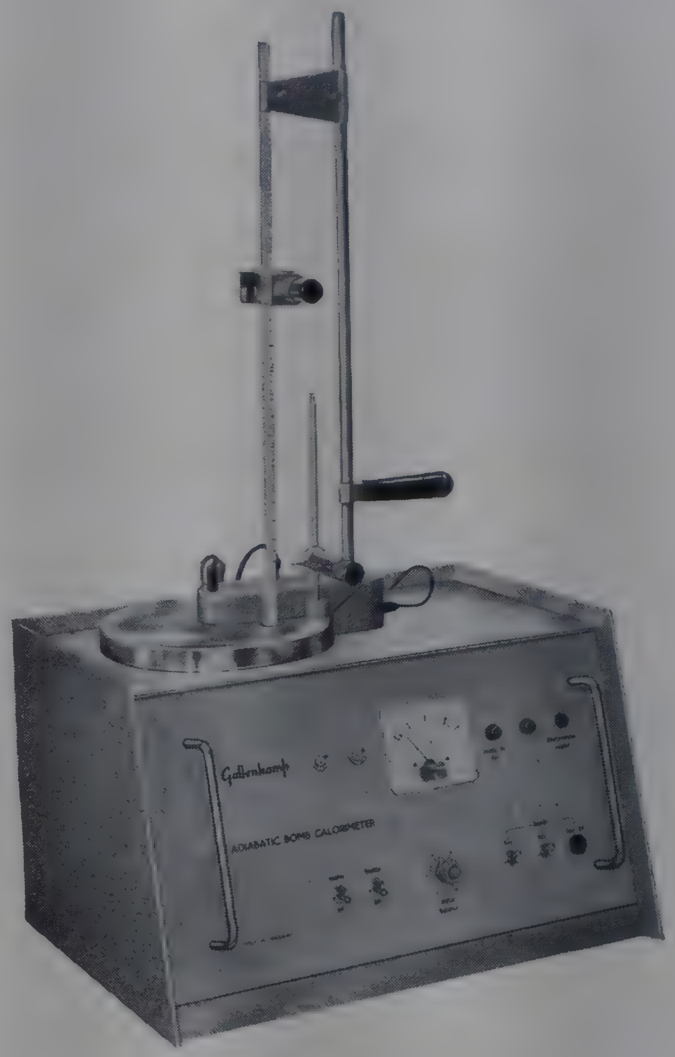
REPLACEMENT PARTS

PE-174	**Candle**	Each	**£20·00**	*fxN*
PE-176	**Wick**	Pack of 50	**£1·05**	*cx*

CALORIFIC VALUE OF LIQUID FUEL—BOMB CALORIMETER METHOD, IP 12. ASTM D240, ASTM D2382, DIN 51785

- Top cover assembly on telescopic lift—no dismantling between tests.
- No handling of calorimeter thermometer—risk of breakage negligible.
- Instantaneous heating for accurate response.
- High speed water circulation through jacket and cover for temperature uniformity.
- Console encloses calorimeter and all control circuits cables and water connections.
- Firing wire continuity tester circuits give visual indication of successful firing. Remote firing facility.
- Swing down control panel for immediate access for servicing.
- Printed circuit for reliability.
- Includes exclusive illuminated reader/vibrator for thermometer.

For full details see CB-100 to CB-353 in List No. sequence.



RAMSBOTTOM CARBON RESIDUE OF PETROLEUM PRODUCTS ASTM D524-IP 14

PE-220

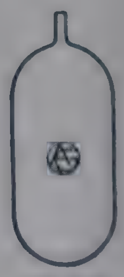
HEATING BLOCK, electrically heated, with accurate temperature control. Comprises a solid cylindrical metal block with six wells. The block is heated by elements clamped to the outside and mounted in a well lagged case. A built-in indicating temperature controller operates from a thermocouple in the block. For 240V a.c. single phase supplies ... ... Each **£325·00** *fxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

PE-222 Control bulb, with thermocouple but without pyrometer ... ... Each **£20·00** *fxN*

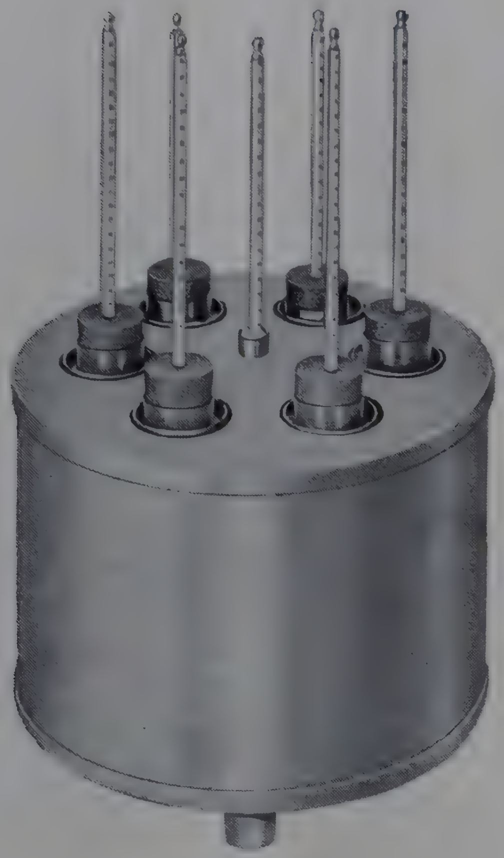
PE-220



PE-230

PE-230

COKING BULB, Ⓐ, borosilicate glass, to ASTM D 524-IP 14. In pack of 10. 10 packs **£22·00** Pack **£2·45** *ax*



PE-254

POUR POINT, ASTM D97-IP 15
CLOUD POINT OF PETROLEUM OILS, ASTM D2500-IP 219

PE-254

CLOUD AND POUR POINTS BATH, 6-test, comprising cylindrical copper tank, 23 cm diameter, depth 16·5 cm, on three feet, with loose copper cover fitted with six pockets and cork disks to take standard test jars, and central thermometer tubulure. **Without test jars, gaskets or thermometers.** Each **£46·00** *bx*

ACCESSORIES AND REPLACEMENT PART

PE-260 **Test jar,** borosilicate glass, internal diameter 32 mm, overall length 120 mm, with mark at 54 mm from the bottom, fitted with cork. Ten **£3·30** Each **£0·39** *ax*

PE-262 **Cork ring gasket,** for test jar ... Pack of 10 **£0·25** *cx*

PE-264 **Cork disks,** spare, for bottom of test bath pockets. Pack of 10 **£0·40** *cx*

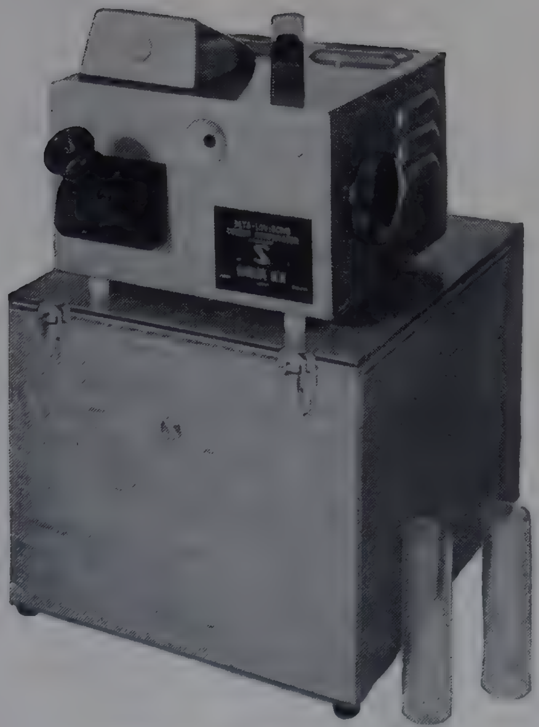
TK-502 **Thermometer,** IP 1F Clouo and Pour
TK-503 **Thermometer,** IP 1C Cloud and Pour
TK-504 **Thermometer,** IP 2F Cloud and Pour
TK-505 **Thermometer,** IP 2C Cloud and Pour

For full details and prices see entries in List No. sequence.

MULTIPLE TEST REFRIGERATED CLOUD AND POUR POINT EQUIPMENT

Comprises three independently controlled baths each with six sleeves for Cloud and Pour Point test jars. The baths operate at 30 to 35°F, 0 to +5degF and −25 to −35°F respectively.

Details and prices on application.



PE-340 with test jars

ASTM COLOUR OF PETROLEUM PRODUCTS ASTM D1500-IP 196

PE-340

COLOUR COMPARATOR, *Seta-Lovibond,* for determining the colour of a wide variety of petroleum products such as lubricating oils, diesel oils and petroleum waxes. The metal housing contains a light source with daylight and opal filters, and front mounted angled optical eyepiece which splits the field of view into two sections, one accepting light transmitted by the sample and the other light passed by the colour standards. Sixteen colour standards are mounted in a rotating turret, and the reference number of the standard viewed appears in an illuminated window near the eyepiece. Supplied complete with case which acts as a stand for the comparator. **Without test jars** ... ... Each **£160·00** *fxN*

When ordering please state voltage and frequency of supply.

ACCESSORIES

PE-343 **Sample container,** for referee work ... Each **£0·50** *fxN*

PE-260 **Cloud and Pour test jar,** for routine work. For full details and price see entry in List No. sequence.

REPLACEMENT PART

PE-346 **Lamp,** colour temperature 2750°K ... Each **£0·25** *fxN*

When ordering please state voltage and frequency of supply.

DETECTION OF COPPER CORROSION FROM PETROLEUM PRODUCTS BY THE COPPER STRIP TARNISH TEST, ASTM D130-IP 154

PE-360
LOW PRESSURE BOMB, *Seta*, for pressures up to 7 kgf/cm², internal diameter 32 mm, internal height 184 mm ... ... Each **£25·00** *fxN*

REPLACEMENT PART

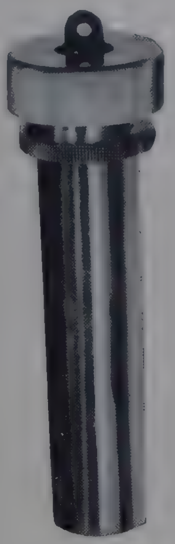
PE-362	**'O' ring seal**	Pack of 10	**£1·50** *fxN*

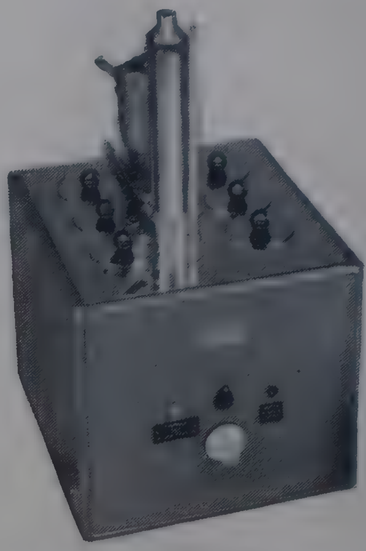
PE-366
DUAL PURPOSE WATER BATH, *Seta*, comprises tank to hold 6 bombs or 18 test tubes, surrounded by an enamelled case, adjustable thermostat, immersion heater, stirrer and condenser. The switching system allows for either boiling or control at 50°C, the condenser preventing excessive loss of water. Six covers with support hooks locate in the chromium plated top. For 200/250V 50 Hz single phase supplies ... Each **£155·00** *fxN*

When ordering please state voltage and frequency of supply.

ACCESSORIES

PE-371	**Copper strip vice,** for five strips ...	Each	**£25·00**	*fxN*
PE-372	**Flat test tube,** for examining copper strips, pack of ten.	Pack	**£6·60**	*fx*
PE-376	**Copper strips,** 76 mm long, 12·5 mm wide, 2·4 mm thick, pack of ten	Pack	**£2·20**	*fx*
TF-180	**Test tube, borosilicate glass,** 24 mm diameter, 150 mm long	For full details and prices see entries in List No. sequence.		
TK-616	**Thermometer,** IP 64F, Specific Gravity, wide range			
TK-617	**Thermometer,** IP 64C, Density, wide range			


PE-360

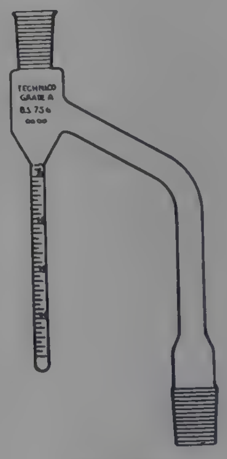

PE-366

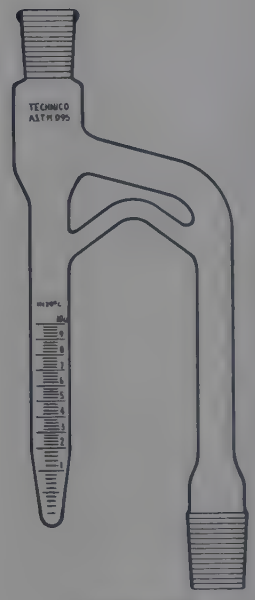
CORROSIVE SUBSTANCES IN GREASE COPPER STRIP TEST, IP 112

BJ-625	**Beaker,** 100 ml, tall form	For details and prices see entries in List No. sequence.
PE-371	**Copper strip vice,** for five strips ...	
PE-376	**Copper strips**	

DEAN AND STARK APPARATUS ASTM D95-IP 74-API 2560

See WJ-130 to WJ-230 in List No. sequence.

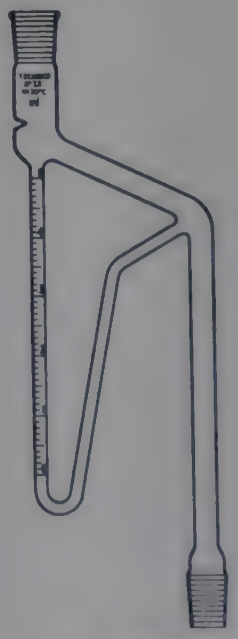

WJ-150


WJ-175

DILUTION OF GASOLINE ENGINE CRANKCASE OILS, ASTM D322-IP 23

PE-550
CONDENSER, (AG), **Liebig,** borosilicate glass, 40 cm, with 24/29 cone ... ... Ten **£13·80** Each **£1·55** *ax*

PE-552
DILUENT TRAP, *Technico*, 5 cm³ subdivided in 0·1 cm³, with 24/29 cone and socket.
Ten **£28·50** Each **£3·20** *ax*


PE-552

Q-FRIL/3S FLASK, 1000 ml, short neck with 24/29 socket. For price and details see QUICKFIT APPARATUS.

Gallenkamp Asda
REGD. TRADE MARK REGD. TRADE MARK

AUTOMATIC STANDARD DISTILLATION APPARATUS

FOR ROUTINE STANDARD DISTILLATION TESTING OF SOLVENTS, GASOLINES, KEROSENES, DIESEL AND FUEL OILS WITH BOILING VAPOUR TEMPERATURES UP TO 400°C

- Alternative models to suit typical product combinations
- Suitable for testing to standard methods ASTM D86-IP 123 Groups 1, 2, 3 and 4, IP 195, ASTM D1078, DIN 51751 and other similar specifications
- Available optionally with flat bed chart recorder or print-out
- High degree of automation and ergonomically grouped controls minimise operator fatigue and human error

- Control circuits with pull-out modules
- Platinum resistance thermometer accuracy
- Receiver compartment at front with sliding door access
- Self resetting timers
- Non-sag low voltage heater
- Adjustable height flask heater assembly
- Solid state heater control
- Prefocused optics for first drop detection and meniscus following

Gallenkamp Asda

REGD TRADE MARK REGD TRADE MARK

DESIGN DATA

GENERAL DETAILS

The distillation flask is heated in a draught shield fitted with a safety drain and a low voltage heater, the height of which can be adjusted to suit the flask simply by rotating a knob. The condenser tube is mounted in a polyurethane foam insulated stainless steel water bath, the temperature of which is controlled by an adjustable solid state *Compenstat* thermostat. The condenser terminates in a receiver compartment which contains the first drop detector, receiver tilt mechanism, no-receiver cut out and meniscus follower; the temperature of this compartment may be controlled by using one of the cooling outfit accessories.

CONTROLS AND INDICATORS

For *Asda* to provide the required test results, it must be correctly programmed for the particular sample under test. The following summary describes the controls which the operator sets and the indicators from which he derives information:

Controls to set

Initial heat
5 minute heat
Final heat
Product type (gasoline, gas oil, solvent, etc.)
End point parameter (final boiling point, dry point, etc.)
Temperature range (0 to 300°C, 0 to 400°C, etc.)
Condenser bath temperature
Drainage period (0, 4, 10, 20 min)
FHA position (anticipated recovery less 5%)

Information displayed

Times displayed for: Start to IBP
IBP to FHA
FHA to EP

Lamps indicate: which period is being timed
heater control operating
mains supply ON or OFF
start (test running)
stop (test terminated)
condenser bath thermostatting

NOTES:

1. The rate of recovery is fixed at 4·5 ml/min for a 100 ml receiver.
2. Timers on the front panel are automatically reset to zero when the start button is pushed for the next test.
3. Temperatures are measured by an accurate platinum resistance thermometer which is compensated to agree with IP thermometer readings.
4. The operator has a choice of four end point parameters, viz. final boiling point, dry point, preselected temperature and preselected recovery.
5. At the end of a test, the meniscus follower automatically returns to zero, a powerful air blower cools the heater compartment (draught shield). An electrical outlet socket is energised to enable the user to fit an internal or external alarm.

CHART RECORDER

The flat bed recorder accepts roll charts and sheets 25 cm wide ruled in °C or °F and % Recovered. **Readability of the charts is better than** 0·5degC on wide ranges and 0·2%fsd on narrow ranges. The pen is automatically placed on the chart at IBP and raised at End Point.

The recorder incorporates an interval marker which is totally independent of the volume/temperature mechanism. This is important because (a) the intervals between marks, which are made every 15 seconds, are a useful guide to operation and show very clearly whether or not a constant recovery rate has been maintained and (b) systems which incorporate an interval marker with the volume/temperature mechanism can distort the trace at vital points.

PRINTER

The indicating printer has six decades, three for temperature in °C and three for % Recovered.

Print-out is to the nearest 1 ml and the nearest 1degC.

Two print-out programmes are provided and may be selected by means of a switch:

(a) IBP, every 5 ml up to FHA, every 1 ml up to End Point, and every 2 min throughout the drainage period.
(b) IBP, every 1 ml to the End Point and every 2 min throughout the drainage period.

OPTIONAL MODELS

Four models are available giving options of wide or narrow temperature ranges and chart or digital print readout.

(i) PE-580: wide temperature ranges with chart readout.
(ii) PE-585: combination of wide and narrow temperature ranges with chart readout.
(iii) PE-590: narrow temperature ranges with chart readout.
(iv) PE-595: wide temperature ranges with digital print readout.

SITE REQUIREMENTS AND SERVICES

The *Asda* should be sited on a firm level bench.

In conditions of high ambient temperature or humidity, *Asda* should be installed in an air conditioned room, especially if the bath and receiver compartment are to be cooled.

Electricity

Voltage: 100/125V and 200/250V single phase with earthed (grounded) neutral
Frequency: 50 or 60 Hz
Power: *Asda* 2·5 kW
Refrigerator 500W

NOTE: Should mains supply voltage be subject to fluctuations of more than 10% a constant voltage transformer may be required.

Mains cooling water
Only required if user selects this means of cooling the condenser bath and/or the receiver compartment.

Overall dimensions

	H W D
Asda	55×100×50 cm
Asda with cooling outfit PE-690	55×100×65 cm
Asda with cooling outfit PE-695	55×100×65 cm
Refrigerator PE-705	25× 35×45 cm

Gallenkamp REGD. TRADE MARK Asda REGD TRADE MARK

COOLING OUTFITS

Three alternative outfits are available to provide for four methods of cooling as detailed in Figs. 1 to 4 below.

(i) PE-690: comprises a receiver compartment cooler which is a heat exchanger with fan and a set of plumbing components. It is used for cooling the receiver compartment only using cold mains tap water or an independent pumped cold water source which must have a heat extraction rate of about 250 kcal/hr at ambient temperatures up to 35°C.

(ii) PE-695: comprises a receiver compartment cooler and a pumping assembly with solenoid valve and thermostat. It is used for cooling the receiver compartment when using ice cubes in the condenser bath.

(iii) PE-705: comprises a receiver compartment cooler, pumping assembly with solenoid valve and thermostat and a bench mounting refrigeration outfit.

The sealed refrigeration compressor is automatically energised when the bath heater *Compenstat* is set to a low temperature.

This outfit is capable of maintaining the condenser bath below 1°C with the receiver compartment at 15°C in ambient temperatures up to 35°C.

In locations where the natural ambient temperature exceeds 35°C the *Asda* and refrigerator must be used in an air conditioned room.

The following table shows the overall temperature ranges specified in the various standard distillation methods. In practice most ranges are sub-divided according to the boiling range of the product.

Test specification	Condenser bath temperature °C	Receiver compartment temperature °C
ASTM D86-IP 123		
Group 1	0 to 1	13 to 18
Group 2	0 to 4	13 to 18
Group 3	0 to 4	13 to 18
Group 4	0 to 60	Within ±3degC of ambient temperature
ASTM D1078 and IP 195		
50 to 70°C	0 to 10	10 to 20
70 to 150°C	25 to 30	20 to 30
>150°C	35 to 50	20 to 30
DIN 51751	0 to 5	13 to 18

ALTERNATIVE METHODS OF COOLING

Legend: B=condenser bath H=heat exchanger F=fan D=drain W=water circulator T=contact thermometer P=pump V=Solenoid valve S=relay R=refrigerator

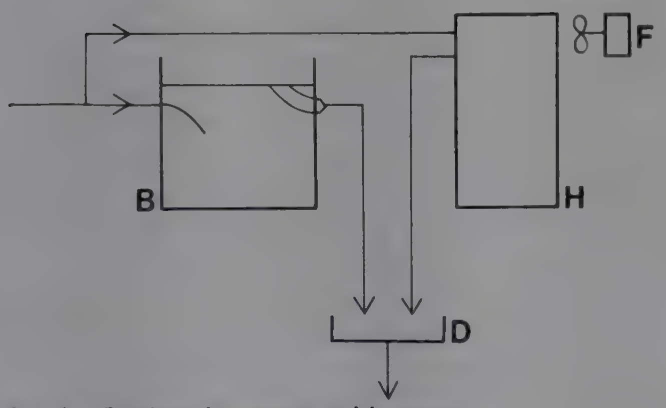


Fig. 1. Cooling by mains cold water.

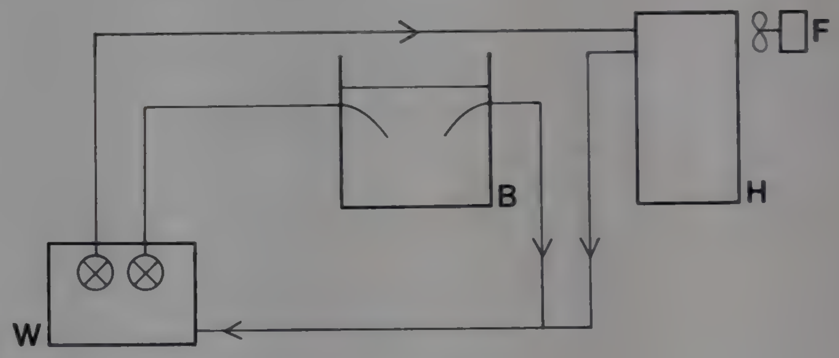


Fig. 2. Cooling by external circulator.

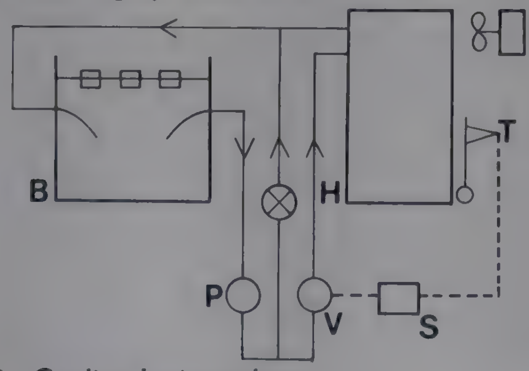


Fig. 3. Cooling by ice cubes.

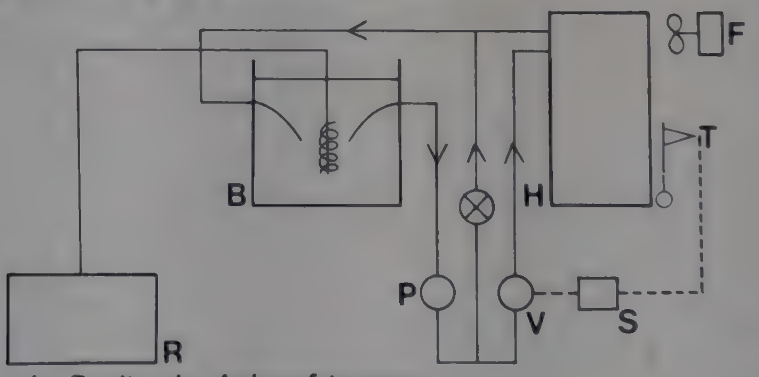


Fig. 4. Cooling by *Asda* refrigerator.

NARROW TEMPERATURE RANGE MODULES

Two modules are available for use with *Asdas* fitted with flat bed recorders. Each module uses the same platinum resistance sensor as does the wide range *Asda* and spans of 10, 20 and 50degC can be supplied anywhere in the range 50°C to 400°C.

(i) PE-745: ranges 0 to 300°C, 0 to 400°C and 5 narrow ranges.

(ii) PE-748: 10 narrow ranges.

DRY POINT DETECTOR

A plug-in photoelectric device for monitoring the base of the flask to terminate the test at the Dry Point specified in ASTM D86-IP 123, ASTM D1078 and IP 195. When this detector is used a special form of flask heater is required to permit the light beam from the lamp beneath the heater compartment to pass through the flask to the photocell.

Gallenkamp Asda

REGD TRADE MARK REGD TRADE MARK

RECORDER CHART MODELS

- **For testing Gasolines, Kerosenes, Fuel and Diesel oils to ASTM D86-IP 123 Groups 1, 2, 3 and 4.**

PE-580

AUTOMATIC STANDARD DISTILLATION APPARATUS, *Gallenkamp Asda*, temperature ranges 0 to 300°C (32 to 580°F) and 0 to 400°C (32 to 760°F), readability 0·5degC. With flat bed recorder. **Requires but does not include flasks, receivers, heater boards and chart rolls.** For single phase supplies with earthed (grounded) neutral.

For 200/250V 50 Hz ... ... Each **£2300·00** *gxN*
For 100/125V 60 Hz ... ... Each **£2350·00** *gxN*

When ordering please state voltage and frequency of supply.

- **For testing Gasolines, Kerosenes, Fuel and Diesel oils, Naphthas, Solvents and SBPs to ASTM D86-IP 123 Groups 1, 2, 3 and 4. ASTM D1078 and IP 195.**

PE-585

AUTOMATIC STANDARD DISTILLATION APPARATUS, *Gallenkamp Asda*, temperature ranges 0 to 300°C (32 to 580°F), 0 to 400°C (32 to 760°F) and 5 narrow temperature ranges which can be any combination of 10, 20 or 50°C spans within the range 0 to 400°C. Readability 0·5degC on wide ranges and 0·2% fsd narrow ranges. With flat bed recorder. **Requires but does not include flasks, receivers, heater boards and chart rolls.** For single phase supplies with earthed (grounded) neutral.

For 200/250V 50 Hz ... ... Each **£2460·00** *gxN*
For 100/125V 60 Hz ... ... Each **£2510·00** *gxN*

When ordering please state: (i) voltage and frequency of supply.
(ii) narrow temperature ranges required.

- **For testing Solvents and SBPs to ASTM D1078 and IP 195.**

PE-590

AUTOMATIC STANDARD DISTILLATION APPARATUS, *Gallenkamp Asda*, with 10 narrow temperature ranges which can be any combination of 10, 20 or 50°C spans within the range 0 to 400°C, readability 0·2% fsd. With flat bed recorder. **Requires but does not include flasks, receivers, heater boards and chart rolls.** For single phase supplies with earthed (grounded) neutral.

For 200/250V 50 Hz ... ... Each **£2530·00** *gxN*
For 100/125V 60 Hz ... ... Each **£2580·00** *gxN*

When ordering please state: (i) voltage and frequency of supply.
(ii) narrow temperature ranges required.

PRINT-OUT MODEL

- **For testing Gasolines, Kerosenes, Fuel and Diesel oils generally to ASTM D86-IP 123 Groups 1, 2, 3 and 4.**

PE-595

AUTOMATIC DISTILLATION APPARATUS *Gallenkamp Asda*, temperature ranges 0 to 300°C and 0 to 400°C, readability to the nearest 1degC and 1 ml. With digital printer. **Requires but does not include flasks, receivers, heater boards and print rolls.** For single phase supplies with earthed (grounded) neutral.

For 200/250V 50 Hz ... ... Each **£2400·00** *gxN*
For 100/125V 60 Hz ... ... Each **£2450·00** *gxN*

When ordering please state voltage and frequency of supply.

Gallenkamp REGD TRADE MARK **Asda** REGD TRADE MARK

INITIAL WORKING ACCESSORIES

GLASSWARE AND HEATER BOARDS

PE-615

WORKING KIT, comprising twelve 125 ml distillation flasks PE-797, five 100 ml receivers PE-617 and one set of heater boards PE-618, hole diameters 32, 38 and 50 mm.
Kit **£33·90** *gx*

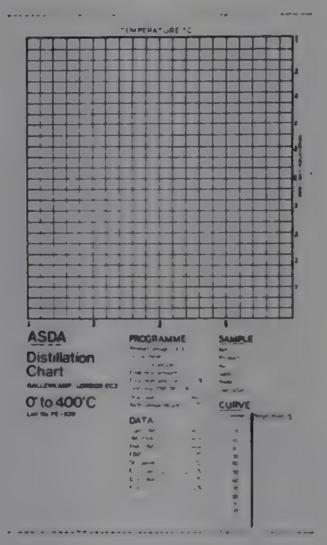
REPLACEMENT PARTS

PE-617 **Receiver,** glass, 100 ml. Ten **£40·00** Each **£4·40** *gx*

PE-618 **Heater boards,** asbestos, 150×150 mm with centre and fixing holes.

Dia. of hole	32	38	50 mm	
Ten	**£4·10**	**4·10**	**4·10**	*gx*
Each	**£0·46**	**0·46**	**0·46**	

PE-797 **Flasks,** borosilicate glass, 125 ml, to ASTM D86-IP 123 and ASTM E133. For prices see entry in List No. sequence.



Typical Chart

RECOMMENDED OUTFITS

For an initial working outfit we recommend the purchase of the following items selected according to requirements:

1.	Basic *Asda*	PE-580 or PE-585 or PE-590 or PE-595
2.	Working Kit	PE-615.
3.	Charts	Ten rolls of each Chart or Print Roll PE-635 to PE-650
4.	Stand-by Spares Kit	PE-670.
5.	Maintenance Kit	PE-685.
6.	Multirange Meter	EE-840.
7.	Decade resistance box	PE-688.
8.	Cooling Outfit	PE-690 or PE-695 or PE-705

CHART AND PRINT ROLLS

Chart rolls are 25 cm wide and perforated every 30 cm across the roll for easy removal from the recorder and to enable individual sheets to be used with the recorder if required.

PE-635

CHART ROLL, wide range, scaled 0 to 300°C; 0 to 100% recovery and with data column for completion by the operator. Approximately 100 charts/roll.
Ten rolls **£16·00** Roll **£1·75** *gx*

PE-637

CHART ROLL, wide range, as PE-635 but **scaled 32 to 580°F** ... ... Ten rolls **£16·00** Roll **£1·75** *gx*

PE-639

CHART ROLL, wide range, as PE-635 but **scaled 0 to 400°C** ... ... Ten rolls **£16·00** Roll **£1·75** *gx*

PE-641

CHART ROLL, wide range, as PE-635 but **scaled 32 to 760°F** ... ... Ten rolls **£16·00** Roll **£1·75** *gx*

PE-643

CHART ROLL, narrow range, scaled in 10°C, 20°C and 50°C spans and 0 to 100% recovery. For use with narrow temperature range *Asdas* only.
Ten rolls **£16·00** Roll **£1·75** *gx*

PE-650

PRINT ROLL, plain blank paper, for use with *Asda* PE-595 only. Approximately 200 tests/roll.
Ten rolls **£12·00** Roll **£1·35** *gx*

STAND-BY SPARES

PE-670

STAND-BY SPARES KIT including, heater assembly, heater elements, lamps, photocells, fuses, relays, recorder pens and other parts which could be required during the first 6 to 12 months of operation ... Each **£65·00** *gx*

ROUTINE REPLACEMENT PARTS

PE-672 **Heater assembly.** Not suitable for use if *Asda* fitted with dry point detector ... ... Each **£16·00** *gx*

PE-673 **Heater element,** replacement for PE-672.
Ten **£9·00** Each **£1·00** *gx*

PE-674 **Exciter lamp** for photocell
Ten **£3·70** Each **£0·43** *gx*

PE-676 **Photocell** ... ... Ten **£34·00** Each **£3·80** *gx*

PE-679 **Pens, disposable,** fibre tipped and ink filled, spare for recorder ... ... Pack of 5 **£6·25** *gx*

When ordering spares and replacement parts subsequent to the purchase of an *Asda* please state the serial number of the *Asda*.

For replacement heater assembly and heater element for use when dry point detector fitted see PE-767 and PE-769 in List No. sequence.

PE-685

MAINTENANCE KIT, comprising tools, lubricants and assorted screws, nuts and washers... Kit **£7·00** *gx*

Recommended test instruments

PE-688 **Decade resistance box** for calibrating temperature recorder ... ... Each **£78·00** *mx*

EE-840 **Multirange meter,** for general servicing and setting photocell currents. For details and price see entry in List No. sequence.

Gallenkamp Asda

REGD TRADE MARK REGD TRADE MARK

COOLING OUTFITS

In general, **cooling of the bath and receiver is needed for all products except gas oils.** Provision is made in *Asda* for four cooling methods depending on local facilities and requirements.

■ FOR COOLING BY MAINS COLD WATER (See **Fig. 1**, page 516)

FOR COOLING BY EXTERNAL COLD WATER CIRCULATOR (See **Fig. 2**, page 516)

PE-690

COOLING OUTFIT, *Gallenkamp*, comprising receiver compartment cooler and plumbing components for connecting to 10 mm bore flexible tubing ... Each **£45·00** *gxN*

Flexible tubing for use with above see TX-625 and TX-778 in List No. sequence.

■ FOR COOLING BY ICE CUBES IN CONDENSER BATH (See **Fig. 3**, page 516)

PE-695

COOLING OUTFIT, *Gallenkamp*, comprising receiver compartment cooler, pumping assembly and plumbing components. For single phase supplies.

For 200/250V 50 Hz ... ... Each **£115·00** *gxN*
For 100/125V 60 Hz ... ... Each **£120·00** *gxN*

When ordering please state voltage and frequency of supply.

■ FOR COOLING BY REFRIGERATOR (See **Fig. 4**, page 516)

PE-705

COOLING OUTFIT, *Gallenkamp*, **refrigerated,** contact thermometer control, comprising receiver compartment cooler, pumping assembly and bench mounting refrigeration outfit. For single phase supplies.

For 200/250V 50 Hz ... ... Each **£290·00** *gxN*
For 100/125V 60 Hz ... ... Each **£295·00** *gxN*

When ordering please state voltage and frequency of supply.

part PE-705

TEMPERATURE RANGE MODULES

Modules which enable the user to match his *Asdas* to the combinations of gasoline, kerosene, oil and solvent testing which his work load imposes.

■ TO CONVERT PE-580 AND PE-590 TO PE-585

PE-745

TEMPERATURE RANGE MODULE, *Gallenkamp*, **combined wide and narrow ranges,** provides 0 to 300°C (32 to 580°F), 0 to 400°C (32 to 760°F) and 5 narrow ranges which can be any combination of 10, 20 or 50degC spans within the total range 50 to 400°C.
Each **£245·00** *gx*

When ordering please state:

- **(i) serial number of *Asda*.**
- **(ii) narrow temperature ranges required.**

ACCESSORIES

PE-635	**Chart roll, wide range,** 0 to 300°C.
PE-637	**Chart roll, wide range,** 32 to 580°F.
PE-639	**Chart roll, wide range,** 0 to 400°C.
PE-641	**Chart roll, wide range,** 0 to 760°F.
PE-643	**Chart roll, narrow range,** 10, 20 and 50°C spans ... ...

For details and prices see entries in List No. sequence.

■ TO CONVERT PE-580 AND PE-585 TO PE-590 TO PROVIDE ALTERNATIVE NARROW RANGES FOR PE-590

PE-748

TEMPERATURE RANGE MODULE, *Gallenkamp*, **narrow range,** provides 10 narrow ranges which can be any combination of 10, 20 or 50degC spans within the total range 50 to 400°C. **Does not provide wide range facilities** ... ... Each **£310·00** *gx*

When ordering please state:

- **(i) serial number of *Asda*.**
- **(ii) narrow temperature ranges required.**

ACCESSORY

PE-643	**Chart roll, narrow range,** 10, 20 and 50°C spans. For details and price see entry in List No. sequence.

DRY POINT DETECTOR

■ FOR DRY POINT TERMINATION OF TEST SPECIFIED IN ASTM D86-IP 123, ASTM D1078 and IP 195

PE-765

DRY POINT DETECTOR, *Gallenkamp*, comprising lamp and photocell assemblies, heater assembly and control module ... ... Each **£101·00** *gx*

ACCESSORIES

PE-797	**Flask,** 125 ml to ASTM D86-IP 123 ...
PE-798	**Flask,** 200 ml to ASTM D1078 and IP 195 ... ...

For prices see entries in List No. sequence.

REPLACEMENT PARTS

PE-767	**Heater assembly.** Only suitable for use when dry point detector fitted ... ... Each **£16·00** *gx*
PE-769	**Heater element,** replacement for PE-767. Ten **£9·00** Each **£1·00** *gx*

DISTILLATION OF CRUDE PETROLEUM—PRELIMINARY DISTILLATION, IP 24

DISTILLATION OF PETROLEUM PRODUCTS ASTM D86-IP 123

DISTILLATION OF NATURAL GASOLINE ASTM D216-IP 191

DISTILLATION RANGE OF VOLATILE ORGANIC LIQUIDS, IP 195, ASTM D1078

DETERMINATION OF DISTILLATION RANGE, BS 658

PE-783

PE-783

SHIELD, for gas heating. Stove enamelled and lined internally with asbestos. Supplied with asbestos shelf with 10 cm hole and three 15 cm square asbestos boards with 32 mm, 38 mm and 50 mm holes, respectively.
Without burner ... ... Each **£31·50** *fxN*

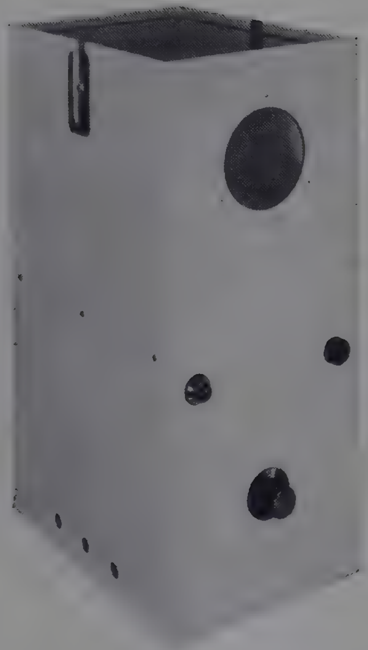
REPLACEMENT PARTS

PE-784 **Asbestos boards,** 15 cm square with centre hole.

Dia. of hole	32	38	50 mm	
Each	**£0·50**	**0·50**	**0·50**	*fx*

ACCESSORIES

BX-075 **Burner, coal gas.**
BX-275 **Burner, methane.**
BX-420 **Burner, LPG.**
For prices and details see entries in List No. sequence.



PE-786

PE-786

SHIELD, as PE-783 but electrically heated by adjustable radiant type element. The heater is controlled by a variable transformer with an ON/OFF switch and an indicator lamp. For 110V or 240V a.c. single phase supplies.
Each **£57·50** *fxN*

REPLACEMENT PARTS

PE-787 **Heater** ... ... Each **£5·00** *fxN*
PE-784 **Asbestos boards.** See entry in List No. sequence.

When ordering please state voltage and frequency of supply.

PE-790

CONDENSER, straight type, IP 123, BS 658 Type 3, with polished nickel plated, single walled, condenser tank on stove enamelled stand ... ... Each **£25·00** *fxN*

PE-791

CONDENSER, single spiral type, with polished nickel plated condenser tank with stove enamelled aluminium box stand ... ... Each **£30·00** *fxN*

PE-792

CONDENSER, Liebig, (AG), BS 658 Type 1 and STPTC C1, borosilicate glass, with bent end and rubber connections, overall length about 600 mm ... Each **£1·85** *ax*

PE-795

CONDENSER, air, (AG), BS 658 Type 2 and STPTC C3, borosilicate glass, length 600 mm ... Each **£0·65** *ax*

PE-797

FLASK, distillation, *Pyrex* glass, 125 ml to ASTM D86-IP 123 and ASTM E 133.
Std. pack of 36 **£26·95** Each **£0·88** *jx*

PE-798

FLASK, distillation, 200 ml to IP 195, and ASTM E 133, borosilicate glass ... ... Ten **£12·40** Each **£1·40** *jx*

PE-790

DISTILLATION RECEIVERS—see CYLINDERS.
DISTILLATION THERMOMETERS—see THERMOMETERS.

DROP POINT OF GREASE, IP 31, BS 894 (Ubbelohde apparatus)

PE-805

DROP POINT OF GREASE APPARATUS, *Seta,* comprising one each IP 40C and IP 41C thermometers fitted with sleeve and case, two metal cups, 600 ml glass beaker, with cover and test tube with cork.
Each **£30·00** *fxN*

REPLACEMENT PARTS

PE-810	**Metal cup**	Pack of 5	**£4·25**	*fx*
PE-812	**Thermometer assembly,** comprising IP 40C thermometer fitted with sleeve	Each	**£7·00**	*fx*
PE-814	**Thermometer assembly,** comprising IP 41C thermometer fitted with sleeve	Each	**£7·00**	*fx*
PE-822	**Test tube, borosilicate glass,** 110 × 25 mm. Ten **£3·00**	Each	**£0·36**	*ax*

DROPPING POINT OF LUBRICATING GREASE, ASTM D566-IP 132

PE-830

TEST TUBE Ⓐ, borosilicate glass, diameter 12 mm, length 100 mm, with three indentations 19 mm from bottom, fitted with corks bored to take thermometer. **Without thermometer.**
Ten **£3·70** Each **£0·43** *ax*

PE-834

CUP, plated brass ... Ten **£8·50** Each **£0·96** *fx*

ACCESSORIES

BJ-625	**Beaker,** borosilicate glass, tall form 400 ml	For full details and prices see entries in List No. sequence.
TK-612	**Thermometer,** IP 62F	
TK-613	**Thermometer,** IP 62C	

SOFTENING POINT OF BITUMEN, RING AND BALL METHOD, IP 58

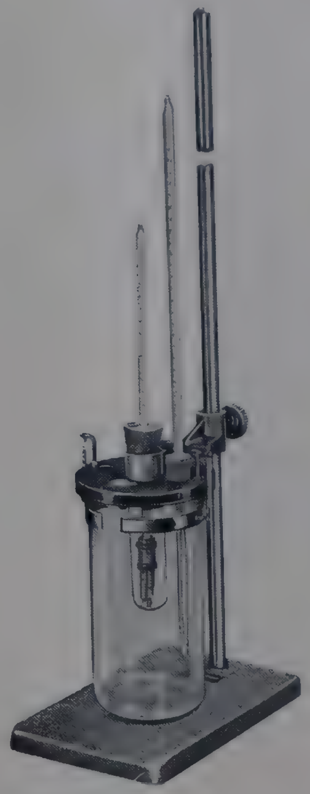
PE-850

RING AND BALL APPARATUS, 2-test, comprising plated brass frame, two standard tapered rings, two ball centring guides and two steel balls. **Without beaker or thermometer** ... ... Each **£10·00** *fx*

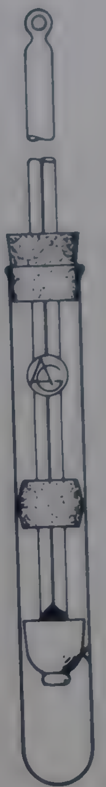
SOFTENING POINT OF ASPHALT (BITUMEN) AND TAR IN ETHYLENE GLYCOL, RING AND BALL ASTM D2398-IP 198

PE-855

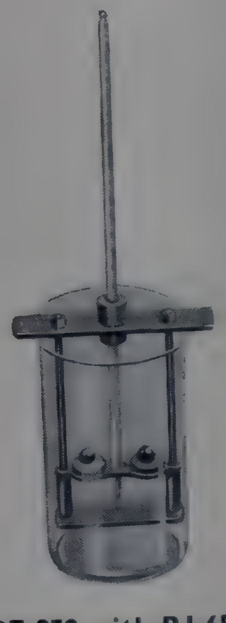
RING AND BALL APPARATUS, 2-test, comprising plated brass frame, two standard shouldered rings, two ball centring guides and two steel balls. **Without beaker or thermometer** ... ... Each **£10·00** *fx*



PE-805 with stand



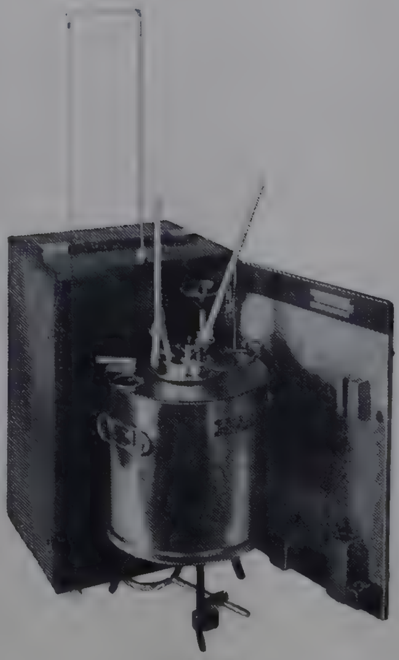
PE-830
PE-834
TK-613



PE-850 with BJ-655 and TK-609

ACCESSORIES AND REPLACEMENT PARTS FOR PE-850 and PE-855

BJ-655	**Beaker,** squat form, 600 ml. For price see entry in List No. sequence.			
PE-862	**Standard ring, tapered,** for PE-850.	Pack of 10	**£10·00**	*fx*
PE-864	**Ball centring guide,** for tapered ring, for PE-850.	Pack of 10	**£14·00**	*fx*
PE-866	**Standard ring, shouldered,** for PE-855.	Pack of 10	**£10·00**	*fx*
PE-868	**Ball centring guide,** for shouldered ring, for PE-855.	Pack of 10	**£14·00**	*fx*
PE-872	**Steel balls,** 9·5 mm dia. ...	Pack of 10	**£0·50**	*fx*
SS-425	**Stirrer**	For prices see entries in List No. sequence.		
SS-455	**Chuck** to hold stirring rotor... ...			
SS-546	**Stirring rotor**			
TK-609	**Thermometer,** IP 60C			
TK-611	**Thermometer,** IP 61C			
TK-666	**Thermometer,** IP 89F			
TK-668	**Thermometer,** IP 89C			



PF-030
PF-032

PF-034

PF-085

FLASH POINT BY THE ABEL APPARATUS—Petroleum (Consolidation) Act 1928 Method, IP 33

FLASH POINT BY THE ABEL APPARATUS, IP 170

PF-030

FLASH POINT APPARATUS, Abel, in accordance with Petroleum (Consolidation) Act 1928. With coal gas test jet, coal gas burner for heating, stirrer, one each thermometers PF-050 and PF-052, pendulum and suspension hook in hardwood case. With Government certification. Each **£107·50** *fxN*

PF-032

FLASH POINT APPARATUS, Abel, as PF-030 but with methane gas burner ... ... Each **£107·50** *fxN*

PF-034

FLASH POINT APPARATUS, Abel, as PF-030 but with test jet for coal gas or methane and electric sample heating element. With Government certification. For a.c. single phase or d.c. supplies.
For 220/240V ... ... Each **£112·50** *fxN*

When ordering please state voltage and frequency of supply.

PF-036

FLASH POINT APPARATUS, Abel, as PF-030 but with oil test jet and sample heating by spirit lamp. With Government certification ... ... Each **£107·50** *fxN*

NOTE: The Government Certificate supplied with the Abel Apparatus was previously known as the Board of Trade Certificate.

REPLACEMENT PARTS

PF-050	**Thermometer,** Abel oil-cup, with collar, scale span 50 to 150°F, subdivided in 1degF, Government certified. (The serial number stamped on instrument must be quoted unless thermometer is ordered with new instrument) ... ... Each **£10·00** *fxN*
PF-052	**Thermometer,** Abel water bath, with collar, scale span 90 to 190°F, subdivided in 1degF, Government certified. (The serial number stamped on instrument must be quoted unless thermometer is ordered with new instrument) ... ... Each **£10·00** *fxN*

ACCESSORIES

TK-540	**Thermometer,** Abel oil-cup, °F ...	For full details and prices see entries in List No. sequence.
TK-541	**Thermometer,** Abel oil-cup, °C ...	
TK-636	**Thermometer,** Abel oil-cup, IP 74F...	
TK-542	**Thermometer,** Abel water bath, °F...	
TK-543	**Thermometer,** Abel water bath, °C.	
TK-638	**Thermometer,** Abel water bath, IP 75F	

FLASH AND FIRE POINTS BY THE CLEVELAND OPEN CUP, ASTM D92-IP 36

PF-085

FLASH POINT APPARATUS, Cleveland, *Seta,* gas heated with coal gas test jet, brass cup with insulated handle. The assembly with a draught screen for burner is mounted on a combined upright and gas manifold which feeds an integral Meker burner and the test jet. **Without thermometer** ... ... Each **£47·50** *fxN*

ACCESSORIES

TK-544	**Thermometer,** IP 28F Cleveland ...	For details and prices see entries in List No. sequence.
TK-545	**Thermometer,** IP 28C Cleveland ...	

FLASH POINT BY THE PENSKY-MARTENS CLOSED TESTER, ASTM D93-IP 34

PF-100

FLASH POINT APPARATUS, Pensky-Martens, *Seta*, gas heated, with gas test jet. Comprises cast iron air bath with stainless steel top plate, mounted on an upright, which is also a gas manifold feeding a needle valve controlled Meker burner, and the adjustable test and pilot flames. An additional control valve supplies gas for an open flash clip PF-130. There is a ring support for the lid when not in use. The cup lid is clamped in position but easily removable. Supplied complete with gas burner and thermometer collar but **without thermometer.**

Each **£55·00** *fxN*

PF-104

FLASH POINT APPARATUS, Pensky-Martens, *Seta*, as PF-100 but with LPG test jet and heating burner.

Each **£65·00** *fxN*

PF-110

FLASH POINT APPARATUS, Pensky-Martens, *Seta*, electrically heated, with gas test jet. Comprises cast iron air bath fitted with side and base heaters. A variable transformer mounted in the bottom compartment ensures smooth and easy control of the temperature rise. Provision is made for accelerated cooling by means of an air connection to the interior of the cylindrical stainless steel baffle surrounding the heater units. Total loading 550W. Supplied with one thermometer collar but **without thermometer.**

For 200/250V a.c. supplies ... ... Each **£85·00** *fxN*
For 110/130V a.c. supplies ... ... Each **£85·00** *fxN*

When ordering please state voltage and frequency of supply.

PF-100

PF-124

GEARED MOTOR UNIT, complete with flexible drive for attaching to Pensky-Martens flash point apparatus PF-100 et seq. Recommended for routine work where it obviates tedious hand operation.

For 200/250V a.c. supplies ... ... Each **£30·00** *fxN*
For 110/130V a.c. supplies ... ... Each **£30·00** *fxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

PF-126	**Thermometer collar**	Each	**£0·50** *fx*
PF-128	**Heating elements for PF-110**	Pair	**£10·00** *fxN*

ACCESSORIES

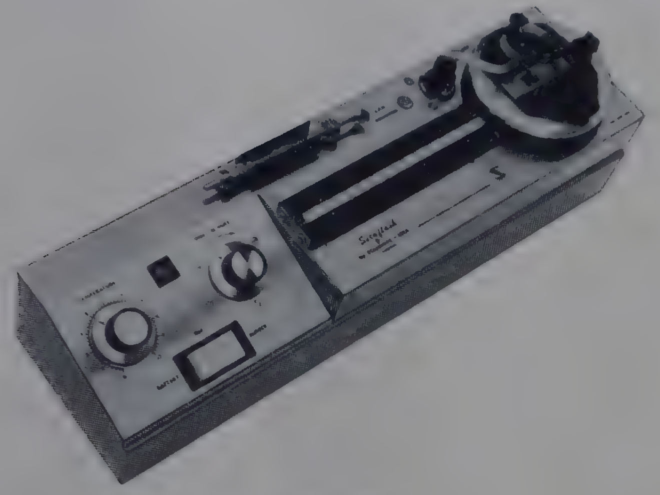
TK-522	**Thermometer,** IP 15F Pensky-Martens low	For details and prices see entries in List No. sequence.
TK-523	**Thermometer,** IP 15C Pensky-Martens low	
TK-524	**Thermometer,** IP 16F Pensky-Martens high	
TK-525	**Thermometer,** IP 16C Pensky-Martens high	

PF-110 with PF-124

FLASH POINT (OPEN) AND FIRE POINT BY THE PENSKY-MARTENS APPARATUS, IP 35

PF-130

CLIP, with gas test jet, for use with flash point apparatus PF-100, PF-104 and PF-110 ... ... Each **£18·50** *fxN*



PF-170

PF-210

Gallenkamp MANUFACTURE:

Technico	**Volumetric Glassware** including: burettes, cylinders, density bottles, flasks, pipettes and viscometers.
AG	**Benchblown Glassware** including: condensers, fractionating columns, soxhlet extractors and stopcocks.
SINTAGLASS	**Sintered Glassware** including: crucibles, filters, funnels, gas distributors and plates.

PORTABLE FLASH TESTERS

PF-170

FLASH POINT APPARATUS, *Setaflash Tester,* **closed cup, range 0 to 110°C,** for rapid flash point checking of flammable products at pre-estimated temperatures. Requires 2 ml of sample and accuracies to within 1degC are possible. Designed for field use and complete with built-in LPG tank having a fuel capacity for about 1000 applications of the test flame. Overall dimensions 41×12×13 cm; weight, net 6 kg; power rating 50W. Includes thermometer range 0 to 110°C. **Requires but not supplied with either power pack PF-173 for 100/250V 50/60 Hz supplies or battery lead PF-174 for 12V d.c. supplies** ... ... Each **£130·00** *fxN*

PF-171

FLASH POINT APPARATUS, *Setaflash Tester,* as PF-170 but **open cup** ... ... Each **£130·00** *fxN*

ACCESSORIES

PF-173	**Power pack,** for 100/250V 50/60 Hz supplies.	Each	**£20·00**	*fxN*
PF-174	**Battery lead,** with clips	Each	**£5·00**	*fxN*
PF-175	**Carrying case,** with shoulder strap ...	Each	**£7·50**	*fxN*
PF-176	**LPG refills cylinder,** large size, for fuel tank.	Pack of 6	**£2·50**	*fx*
PF-177	**Adapter,** for mains gas supply ...	Each	**£3·00**	*fxN*
PF-178	**Thermometer,** Fahrenheit, range 32 to 230°F.	Each	**£2·70**	*fx*
PF-179	**Magnifier,** for thermometer	Each	**£1·25**	*fxN*
PF-181	**Cooling block,** comprising Dewar flask with metal block. Requires charging with refrigerant.	Each	**£15·00**	*fxN*
PF-182	**Cooling block,** metal	Each	**£2·50**	*fxN*

PF-185

FLASH POINT APPARATUS, *Setaflash Tester,* **closed cup** as PF-170 but with thermometer for **temperature range 100 to 280°C.** Overall dimensions 42×16×17 cm; weight, net 8 kg; power rating 100W. **Requires but not supplied with either power pack PF-188 for 100/250V 50/60 Hz supplies or battery lead PF-174 for 12V d.c. supplies** ... ... Each **£180·00** *fxN*

PF-186

FLASH POINT APPARATUS, *Setaflash Tester,* as PF-185 but **open cup** ... ... Each **£180·00** *fxN*

ACCESSORIES

PF-188	**Power pack** for 100/250V 50/60 Hz supplies.	Each	**£25·00**	*fxN*
PF-189	**Carrying case** with shoulder strap ...	Each	**£10·00**	*fxN*
PF-190	**Thermometer,** Fahrenheit range 212° to 536°F.	Each	**£3·40**	*fx*
PF-174	**Battery lead** with clips	For prices see entries above.		
PF-176	**LPG refills**			
PF-177	**Adapter** for mains gas supply ...			
PF-179	**Magnifier,** for thermometer ...			
PF-181	**Cooling block,** for refrigerant ...			
PF-182	**Cooling block,** metal			

SETAVAP TESTER ACCESSORY

for use with PF-170 and PF-185

Designed primarily to detect contamination of gasoline by kerosene by comparing residue volumes in standard and sample wells after heating. Can be used also to detect contamination in other volatile and non-volatile products. The evaporation chamber fits the sample well of either PF-170 or PF-185.

PF-210

CONTAMINATION DETECTOR, *Setavap Tester,* as specification, with two sampling pipettes and bench stand ... ... Each **£20·00** *fxN*

HYDROCARBON TYPES IN LIQUID PETROLEUM PRODUCTS
ASTM D1319-IP 156

PF-310

COLUMN, (AG), adsorption, standard wall glass tubing, with spherical cup S29 (28/12) and vinyl tubing connecting separator and analyser sections. Overall length approx. 170 cm ... ... Each **£7·00** *ax*

PF-312

COLUMN, (AG), adsorption, precision bore glass tubing, with spherical cup S29 (28/12) and spherical joint S13 (12/2) in analyser section. Overall length approx. 170 cm. Each **£9·60** *ax*

For suitable joint clips see JR-260, S29 and S13 in List No. sequence.

FREEZING POINT OF AVIATION FUELS
ASTM D2386-IP 16

PF-360

FREEZING POINT APPARATUS, *Seta*, comprising unsilvered vacuum flask in protective case and a clear jacketed sample tube with stopper, packing gland and stirrer. **Without thermometer** ... Each **£35·00** *fxN*

REPLACEMENT PARTS

PF-362	**Jacketed sample tube**	Each	**£3·75** *fxN*
PF-364	**Vacuum flask,** unsilvered	Each	**£4·50** *fxN*
PF-366	**Packing gland**	Each	**£5·00** *fxN*

ACCESSORY

TK-521 **Thermometer,** IP 14C. For details and price see entry in List No. sequence.

OXIDATION STABILITY OF AVIATION FUELS ASTM D873-IP 138

OXIDATION STABILITY OF GASOLINE
ASTM D525-IP 40

PF-400

OXIDATION STABILITY BOMB, 18/8 chromium nickel alloy steel, plated gunmetal sealing ring, and neoprene gasket. The feed tube is fitted with a needle valve ... ... Each **£80·00** *fxN*

REPLACEMENT PART

PF-402	**Gasket,** neoprene	Ten	**£1·50** *fx*

ACCESSORIES

PF-404	**Flexible tube,** 1·5 metres long, with couplings for connecting bomb to recorder	Each	**£6·00** *fxN*
PF-406	**Wrench,** for tightening closure ring ...	Each	**£7·50** *fxN*
PF-408	**Bench socket,** for body of bomb ...	Each	**£5·00** *fxN*
PF-410	**Glass liner,** with cover, borosilicate glass. Ten **£22·00**	Each	**£2·35** *fx*

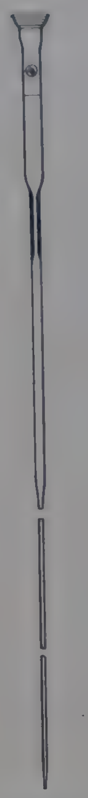
PF-414

OXYGEN CHARGING OUTFIT, comprising pressure regulator with two gauges for attaching to oxygen cylinder and 1·8 metres flexible pressure hose with air chuck for fitting to bombs ... Each **£35·00** *fxN*

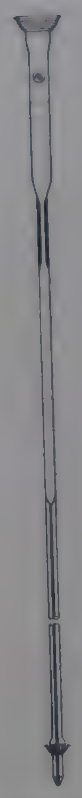
PF-420

PRESSURE RECORDER, two pen, with 25 cm dia. chart, range 80 to 200 lbf/in² in 2 lb divisions, complete with 3-heat switch, power rating 2 kW. Complete with 200/220 or 230/250V 50 Hz single phase supplies. Each **£43·85** *fxN*

When ordering please state voltage and frequency of supply.



PF-310



PF-312

PF-430

PF-430

WATER BATH, for two bombs, constructed of heavy gauge tinned brass. Inside dimensions 35×30×41 cm deep, with stainless steel top, lagged and provided with 2·5 cm overhang for flush mounting in bench top. Fitted with 3-heat switch, power rating 2 kW. Complete with condenser and lids but without bombs. For 110/120 or 230/250V a.c. single phase supplies ... Each **£160·00** *fxN*

When ordering please state voltage and frequency of supply.

PF-650

PENETRATION OF BITUMEN, ASTM D5-IP 49

CONE PENETRATION OF LUBRICATING GREASE, ASTM D217-IP 50

CONE PENETRATION OF PETROLATUM, ASTM D937-IP 179

PENETRATION OF SEMI-FLUID GREASES, IP 167

NEEDLE PENETRATION OF PETROLEUM WAXES, ASTM D1321

PENETROMETERS

PF-650

PENETROMETER, *Seta,* **standard manual model,** with **rack and pinion adjustment** of needle or cone tip. On heavy base with adjusting feet and inset spirit level. The head may be swung to one side for testing samples in a water bath. Readout is on a 15 cm dia. dial graduated 0 to 400 in intervals of 0·1 mm. With 47·5 g plunger and one each 50 g and 100 g weights. **Without needles or cones** ... ... Each **£55·00** *fxN*

PF-652

PENETROMETER, *Seta,* **standard automatic model,** as PF-650 but with solid state timer for 5, 8, 10 and 12 seconds free fall, after which the electromagnetic head is locked. **Without needles or cones.** For 100/130 and 200/250V 50/60 Hz single phase supplies. Each **£130·00** *fxN*

PF-660

PENETROMETER, *Seta,* **universal manual model,** as PF-650 but with **geared drive** having coarse and fine controls and with read out on an 11 cm dia. covered dial fitted with automatic zero reset. **Without needles or cones** ... ... Each **£80·00** *fxN*

PF-662

PENETROMETER, *Seta,* **universal automatic model,** as PF-660 but with solid state timer for 5, 8, 10 and 12 seconds free fall, after which the electromagnetic head is locked. **Without needles or cones.** For 100/130 and 200/250V 50/60 Hz single phase supplies. Each **£155·00** *fxN*

PF-662

GENERAL ACCESSORIES

PF-671	**Adjustable mirror,** with clamp ...	Each	**£7·00** *fxN*
PF-673	**Sample container,** 55 mm dia. × 35 mm deep to ASTM D5-IP 49 ... Ten **£1·00**	Each	**£0·17** *fx*
PF-676	**Sample container,** 70 mm dia. × 45 mm deep to ASTM D5-IP 49 ... Ten **£1·00**	Each	**£0·17** *fx*
PF-677	**Transfer dish,** ASTM D5-IP 49 ...	Each	**£2·50** *fx*
PF-681	**Sample container,** 102 mm dia. × 63 mm deep to ASTM D937-IP 179	Each	**£5·00** *fxN*
PF-683	**Test specimen container,** 25 mm dia. × 32 mm deep, open both ends, to ASTM D1321 ...	Each	**£3·00** *fxN*
TK-565	**Thermometer,** IP 38C. For details and price see entry in List No. sequence.		

PENETRATION CONES AND NEEDLES

PF-694
PENETRATION NEEDLE, to ASTM D5-IP 49.
Each **£1·65** *fx*

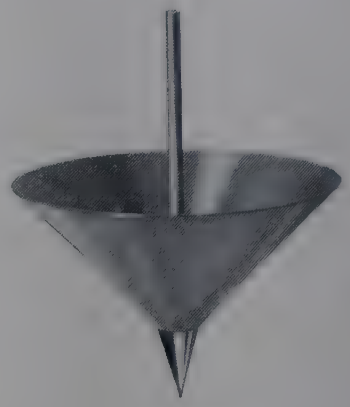
PF-698
PENETRATION NEEDLE FOR WAXES, to ASTM D1321 ... ... Each **£10·00** *fxN*

PF-705
PENETRATION CONE, to ASTM D217-IP 50, for penetration of grease to a limiting value of 400 and petrolatum to ASTM D937-IP 179 ... ... Each **£18·00** *fxN*

PF-715
PENETRATION CONE, to IP 167, for penetration of semi-fluid greases having penetrations greater than 350 ... ... Each **£25·00** *fxN*

PF-725
PENETRATION CONE, quarter scale, to ASTM D1403, for penetration of lubricating grease.
Each **£25·00** *fxN*

ACCESSORY
PF-727 **Plunger** for use with PF-725 ... ... Each **£10·00** *fxN*

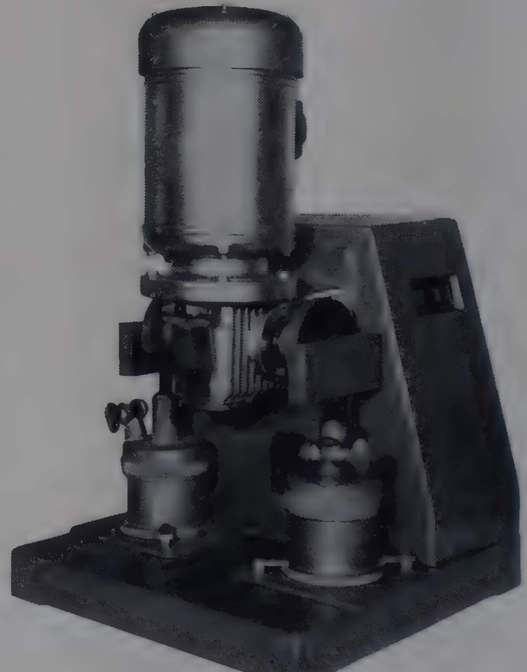

PF-705
PF-715

GREASEWORKERS

PF-740
GREASEWORKER, *Seta*, to ASTM D217-IP 50 and IP 167, with central operating rod, pot and watertight cover fitted with air release cock ... Each **£35·00** *fxN*

PF-760
GREASEWORKER, MECHANICAL, electrically driven, with two greaseworkers to ASTM D217-IP 50 and IP 167. The machine is driven by a motor through a reduction gear to give a speed of 60 strokes per minute. The motor has overload protection and a no-volt trip starter. A five figure counter indicates the number of strokes. For 100/110, 200/220 or 230/250V 50 Hz single phase supplies ... ... Each **£285·00** *fxN*

When ordering please state voltage and frequency of supply.


PF-760

PHOSPHORUS IN LUBRICATING OIL, IP 148

FJ-160	**Kjeldahl flasks,** 300 ml	For details and prices see entries in List No. sequence.
NR-090	**Heater unit,** gas heated, for six Kjeldahl flasks	
NR-094	**Support rods**	
NR-022	**Flask rest**	
NR-010	**Vapour tube stand**	
NR-120	**Vapour tube**	
NR-124	**End cap**	

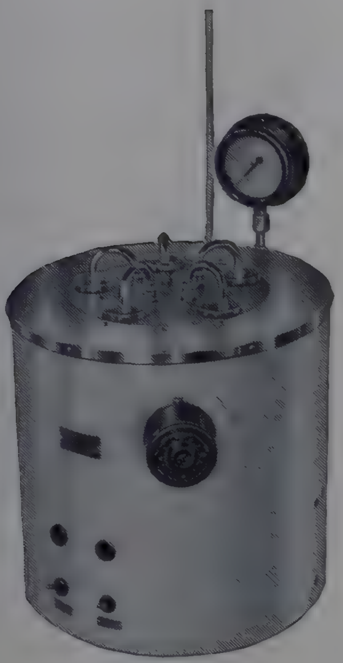
For suitable fume extraction equipment see NR-132 et seq.

SALT CONTENT CRUDE PETROLEUM, IP 77

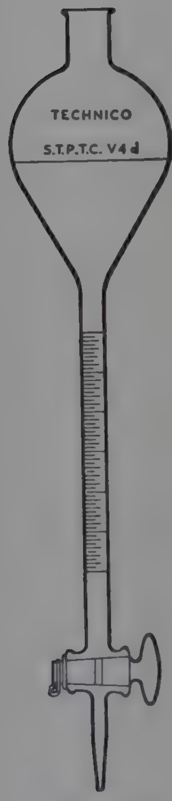
PH-400	**Flask**	For details and prices see entries in List No. sequence.
PH-404	**Reflux condenser**	
PH-406	**Tap funnel**	
ED-322	**Rheostat**	

SAPONIFICATION NUMBER, ASTM D94-IP 136

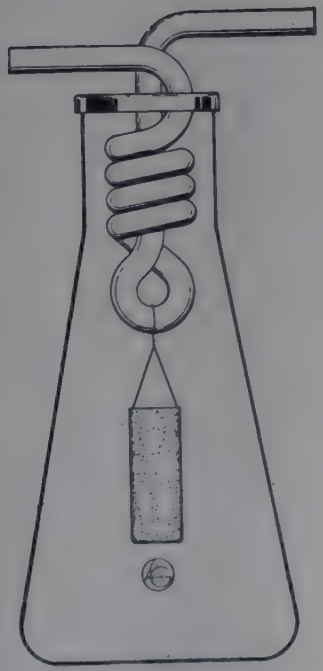
CU-550	**Reflux condenser,** cone 24/29 ...	For details and prices see entries in List No. sequence.
FJ-058	**Flask,** conical, 250 ml	
HL-052	**Hotplate**	



PF-800



PF-880



Extraction assembly with PF-960 &c.

EXISTENT GUM IN FUELS BY JET EVAPORATION, ASTM D381-IP 131

Specification

Comprises a well-lagged aluminium heating block in a stove enamelled cylindrical outer case. A stainless steel preheating coil and manifold are cast into the block in which the five wells are bored. The block is electrically heated by two elements rated at 850 and 1400W respectively. The 850W block heater operates in conjunction with the thermostat and is used on its own for the air jet method. The 1400W steam boost heater is used for the steam jet method and is left on continuously with the block heater for this method. The heaters and preheating coils are so arranged as to render the use of an external super heater unnecessary. A dial type flowmeter is fitted to the air inlet.

Supply requirements

Air	5 litres/sec at 300 gf/cm² approx.
Dry steam	5 litres/sec at 1·2 kgf/cm² approx.

PF-800

EVAPORATION BATH, 5-test, as specification, complete with 5 conical outlet adapters and 5 beakers. Power rating 2250W. For 100/120 or 200/250V a.c. single phase supplies ... ... Each **£350·00** *fxN*

When ordering please state voltage and frequency of supply.

PF-810 **Beaker,** borosilicate glass height 76 mm high, outside diameter 51 mm ... ... Pack of 10 **£3·00** *cx*

NEUTRAL OIL STPTC, PC4 and GB 5

PF-880

RECEIVERS, separating funnel, STPTC, *Technico,* **Class A.**

Schedule No.	V4d	V4e	
Stem capacity	3	1 cm³	
Each	**£3·85**	**3·85**	*ax*

SEDIMENT IN CRUDE AND FUEL OILS BY EXTRACTION, ASTM D473-IP 53

PF-960

CONDENSER, tin plated ... ... Each **£6·75** *mx*

PF-962

THIMBLE, fused alumina, height 7 cm, diameter 2·5 cm, weighing between 15 and 17 g.
Ten **£9·00** Each **£1·00** *fx*

ACCESSORIES

PF-964	**Thimble basket**	Each	**£10·00**	*fx*
PF-965	**Water cup**	Each	**£1·00**	*ax*
FJ-070	**Flask,** conical, wide mouth, capacity 1 litre	For details and prices see entries in List No. sequence.		
PR-680	**Wire,** platinum, 0·38 mm diameter (20 cm length required)			

SPECIFIC GRAVITY AND DENSITY, IP 59, IP 189, IP 190, ASTM D70, ASTM D941, STPTC V12, V14

DJ-534	**Density bottle,** with capillary stopper	For details and prices see entries in List No. sequence.
DJ-550	**Density bottle,** with capillary stopper and ground-on cap	
DJ-560	**Density bottle,** Hubbard, to STPTC Schedule V12	
DJ-780	**Pyknometer tube,** Sprengel, to STPTC Schedule V14	
DJ-790	**Pyknometer tube,** Lipkin, to IP 189	

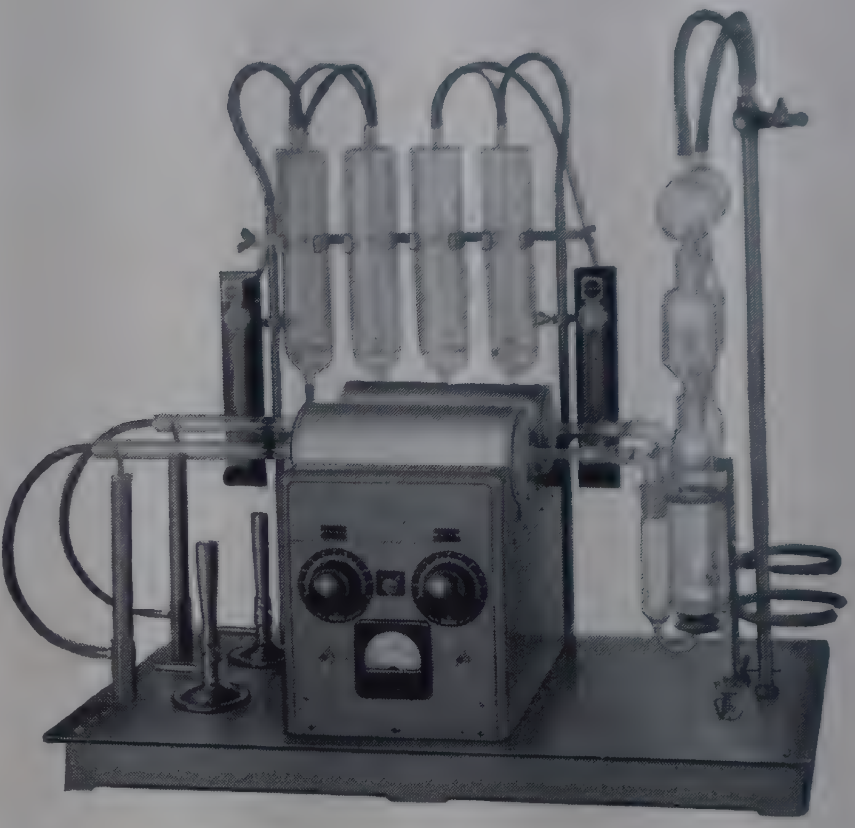
SULPHUR CONTENT—Quartz Tube Method, IP 63

PH-230
COMBUSTION UNIT, 2-test, electrically heated, *Seta*. Comprising dual furnace, pyrometer and changeover switch, energy regulator and thermocouple for each furnace, and control switches. The furnaces operate at 24V supplied from stepdown transformers. Oxygen, air and vacuum lines are built into the base. For 110/130V or 200/250V a.c. single phase supplies only. **Without glassware or flowmeters** ... . Each **£340·00** *fxN*

When ordering please state voltage and frequency of supply.

PH-245
GLASSWARE, IP TYPE I for PH-230, comprising two each silica combustion tubes, adapters, 90° elbows, absorbers, splash heads and four scrubbers. Set **£88·00** *fxN*

For FLOWMETERS see FL-422, range 1·5 to 5·0 litres/min, in List No. sequence.



PH-230 with PH-245 and accessories

SULPHUR IN PETROLEUM PRODUCTS AND LIQUEFIED PETROLEUM (LP) GASES, Lamp Method, ASTM D1266—IP 107

PH-290
ASSEMBLY, 11-test unit, *Seta*, comprising framework, two manifolds for supplying air, and needle valves for each circuit. The absorbers are supported in movable blocks on a stainless steel platform. Two scrubbers for incoming air and three manometer type pressure regulators are supported at the rear. **Without glassware.** Each **£230·00** *fxN*

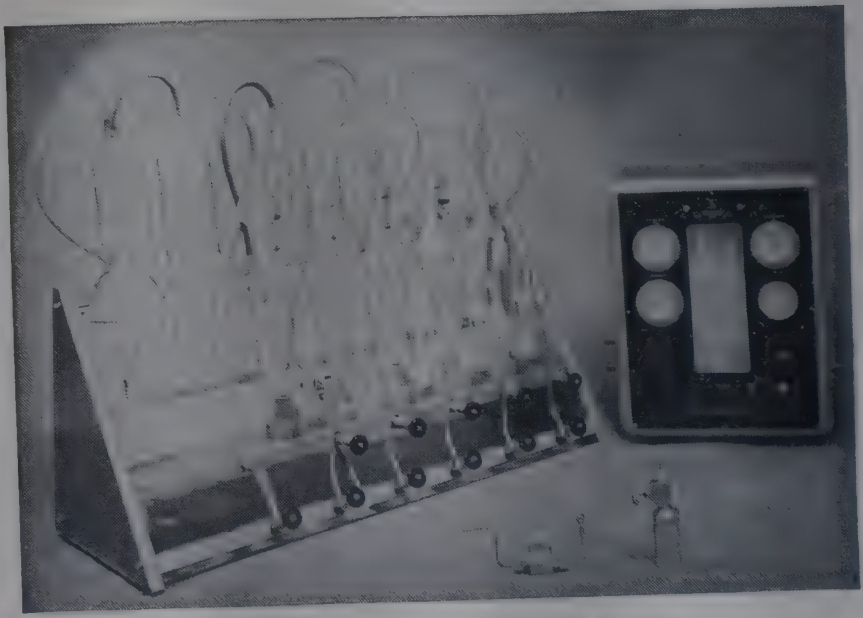
PH-294
GLASSWARE, for PH-290, comprising eleven each of flasks, standard burners, chimneys, absorbers, splash bulbs, and three pressure regulators, two scrubbers and two levelling bulbs ... ... Set **£190·00** *fxN*

PH-296
ASSEMBLY, 5-test unit, *Seta*, as PH-290. **Without glassware** ... ... Each **£185·00** *fxN*

PH-298
GLASSWARE, for PH-296, comprising five each of flasks, standard burners, chimneys, absorbers, splash bulbs, and three pressure regulators, two scrubbers and two levelling bulbs ... ... Set **£111·00** *fxN*

ACCESSORIES

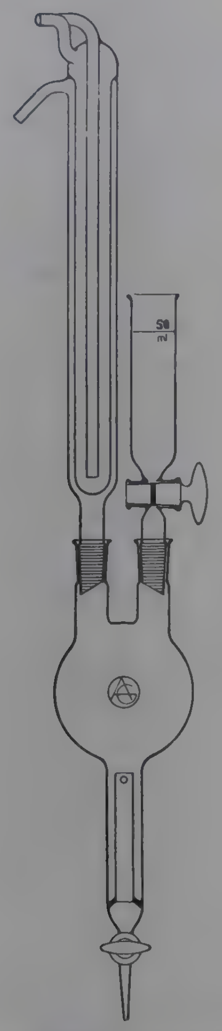
PH-316	**Flask,** for aromatic samples	Each	**£2·00** *fxN*
PH-318	**Burner,** for aromatic samples	Each	**£2·50** *fxN*
PH-320	**Burner,** for LPG samples	Each	**£2·50** *fxN*
PH-325	**Sampling bomb,** 100 ml, single valve model, for LPG samples	Each	**£30·00** *fxN*
PH-326	**Auxiliary regulating valve** for LPG samples, with tubing	Each	**£22·00** *fxN*



PH-296 with accessories and PH-328

PH-328
SYNTHETIC AIR UNIT, *Seta*, for supplying a 70% CO_2 30% O_2 gas mixture to the lamp sulphur apparatus using gases from commercial cylinders. The pressure is controlled by two single stage regulating valves. Built-in flowmeters with an illuminated panel are provided and a thermostatically controlled heater prevent the CO_2 freezing. **Without gas cylinders.** For 110/130 and 200/250V a.c. single phase supplies ... Each **£285·00** *fxN*

When ordering please state voltage and frequency of supply.

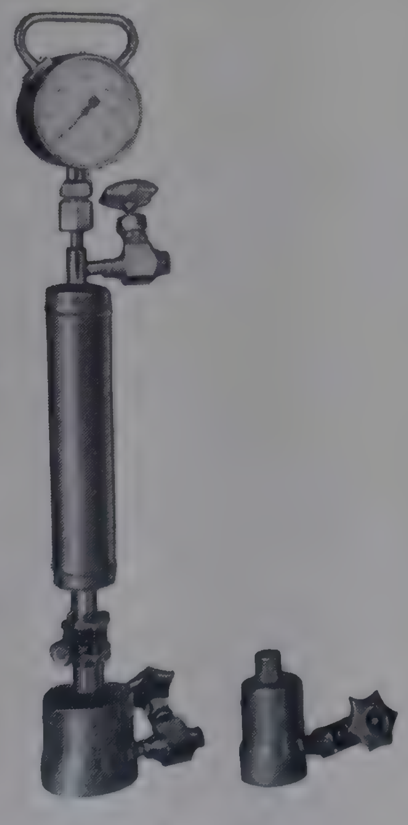


PH-400 to PH-406
(Heater winding not illustrated)

THERMOMETERS, IP Standard
See TK-502 et seq. in List No. sequence.

PH-510
with
PH-520

PH-500



PH-552
with
PH-562

ACIDITY (INORGANIC) OF PETROLEUM PRODUCTS—Colour Indicator Titration Method, IP 182

LEAD IN GASOLINE—Gravimetric Method, ASTM D526-IP 96

PH-400
FLASK, Ⓐ, 2-neck, borosilicate glass, 500 ml with two 19/26 sockets, heating tube, stopcock. Complete with 250W heater winding for 230/250V supplies terminating in a connector block ... ... Each **£7·70** *bx*

PH-404
REFLUX CONDENSER, Ⓐ, borosilicate glass, length 300 mm, with 19/26 cone ... Each **£2·65** *ax*

PH-406
TAP FUNNEL, Ⓐ, with mark at 50 cm³ and 19/26 cone ... ... Each **£1·85** *ax*

ED-322 **Rheostat,** enclosed pattern, to reduce heater input to about 50W, 25 × 3 cm tube, 265 ohm 1A. For price see entry in List No. sequence.

When ordering please state voltage and frequency of supply.

VAPOUR PRESSURE—REID METHOD—IP 69, ASTM D323

VAPOUR PRESSURE LIQUID PETROLEUM GASES IP 161, ASTM D1267

PH-500
VAPOUR PRESSURE BOMB, *Seta*, **Reid immersion sampling type to IP 69.** Comprising air chamber, gasoline chamber with one opening, bayonet coupling and neoprene gasket ... ... Each **£32·00** *fxN*

PH-510
VAPOUR PRESSURE BOMB, *Seta*, **Reid pressure sampling type to IP 69.** Comprising air chamber, gasoline chamber with two openings, the lower section being connected through a gate valve and fitted with a needle valve ... ... Each **£48·00** *fxN*

REPLACEMENT PART
PH-512 **Gasket,** for PH-500 and PH-510. Pack of 10 **£0·50** *fx*

PH-520
PRESSURE GAUGES, test gauge quality to IP 69. Chromium plated case with plastics front, and carrying handle. Ranges 0 to 5, 15, 30, 45, 60, 100 or 250 lbf/in². Each **£16·75** *fxN*

When ordering please state range required.

PH-550
VAPOUR PRESSURE BOMB, *Seta*, **LPG type to IP 161.** The main chamber has a bleed valve and the 20% relative capacity liquid chamber has a filling valve. Each section is tested to 70 kgf/cm² hydrostatic pressure. Each **£180·00** *fxN*

PH-552
VAPOUR PRESSURE BOMB, *Seta*, **LPG type to IP 161,** as PH-550 but with liquid chamber 33⅓% relative capacity ... ... Each **£185·00** *fxN*

PH-554 **Sampling connector,** 90 cm long, fit inlet valve of PH-550 and PH-552 ... ... Each **£8·50** *fxN*

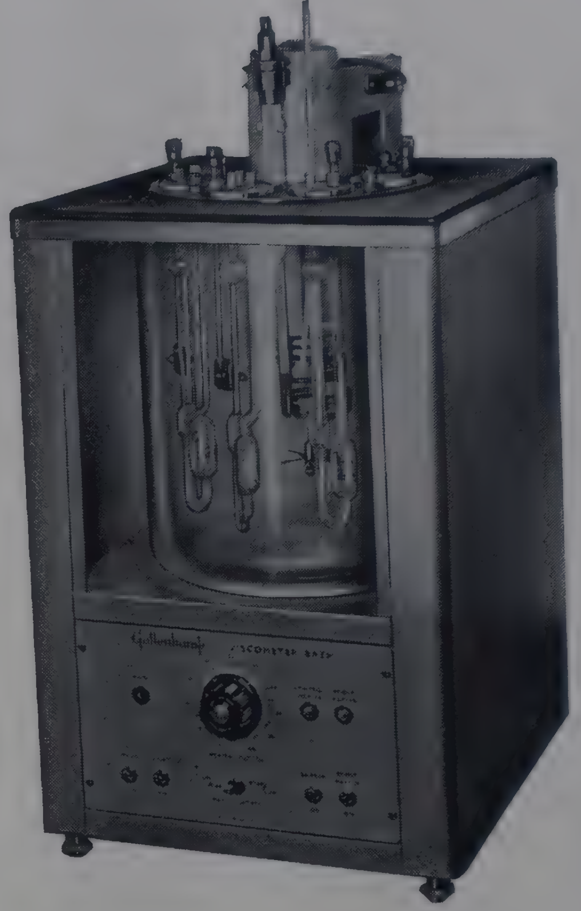
PH-562
PRESSURE GAUGES, test gauge quality to IP 161, for LPG bombs. Similar to PH-520. Ranges 0 to 120, 350 or 600 lbf/in². ... ... Each **£16·75** *fxN*

When ordering please state range required.

PH-580
THERMOSTATIC WATER BATH, *Seta*, for **6 Reid** or **4 LPG** vapour pressure bombs. With immersion heater, temperature controller, drain tap, and constant level. Stirring is by an air bubbler. The top compartment has a hinged cover for easy access. Finished in stove enamel and mounted on castors. Power consumption 3 kW max. For 100/130, 200/220 or 220/250V a.c. single phase supplies only ... ... Each **£230·00** *fxN*

Gallenkamp VISCOMETER BATH

REGD. TRADE MARK



VISCOSITY OF TRANSPARENT AND OPAQUE LIQUIDS (KINEMATIC AND DYNAMIC VISCOSITIES) ASTM D455-IP 71, BS 188

- Maximum operating temperature 120°C
- Unique turntable holder permits each viscometer to be brought to the front as required
- Convenient layout minimises operator fatigue
- Workpiece illuminated brilliantly but without glare
- Designed for easy cleaning and simple maintenance
- Built-in boost for initial heating

For full details see VS-615 in List No. sequence.

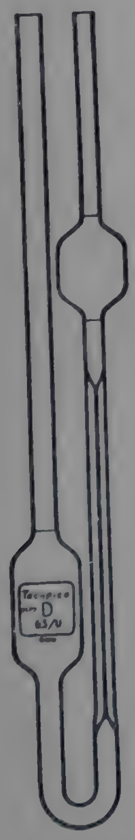
For similar Viscometer Bath for use up to 250°C see VS-670 in List No. sequence.

Technico VISCOMETERS

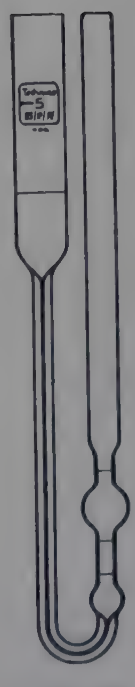
REGD. TRADE MARK

To ASTM D455—IP 71 and BS 188

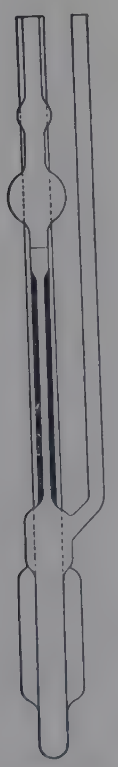
- Standard U-tube
- Reverse flow
- Suspended level
- Ubbelohde suspended level
- Cannon-Fenske



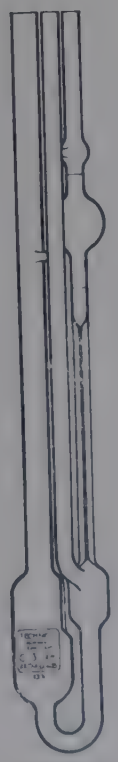
VS-220



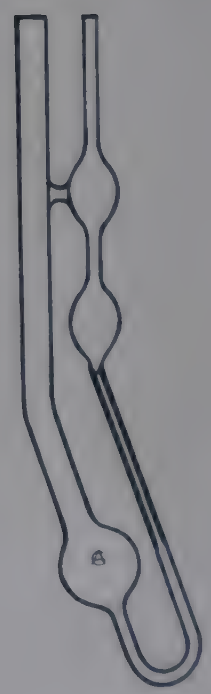
VS-250



VS-280



VS-290



VS-310

For full details see entries in List No. sequence.

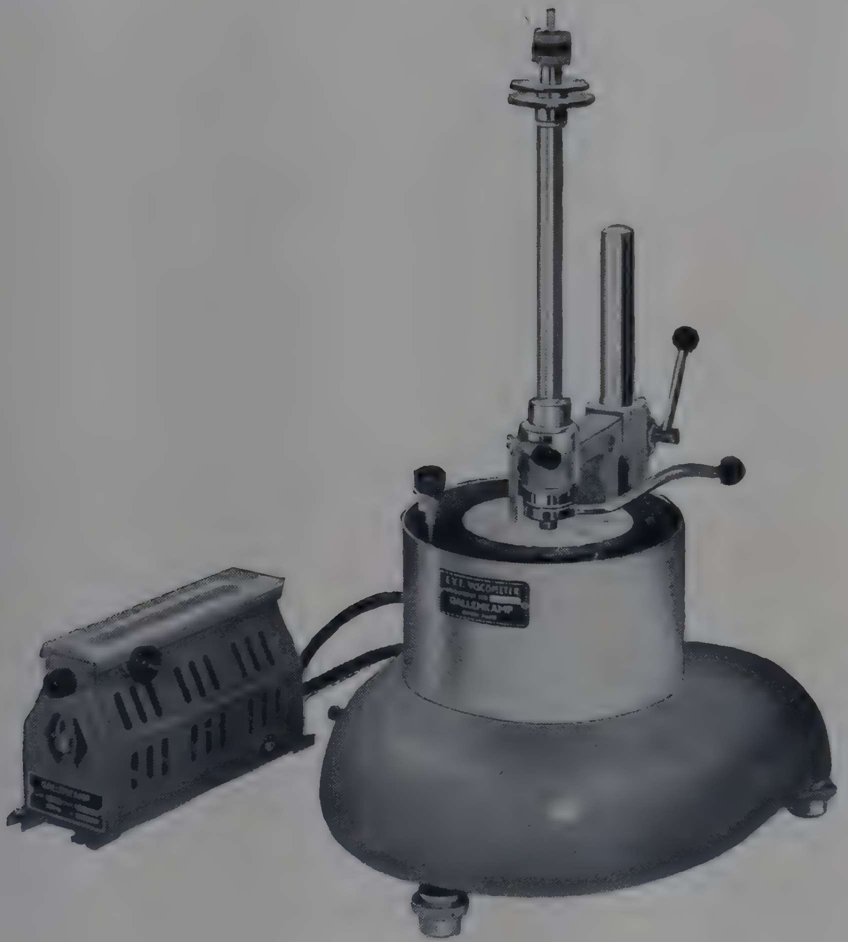
Gallenkamp EVT VISCOMETER

For determination of the equi-viscous temperature of road tars, pitches, bitumens, etc. to STPTC RT 3.

Reference: G. H. Fuidge, A. L. Deadman and A. L. Hutton, Chemistry and Industry, 1948, pp. 601-602.

- **EVT obtained directly, accuracy ±0·2degC**
- **Determinations independent of temperature susceptibility of tar**
- **One apparatus covers wide range of materials**
- **Only 7·5 ml sample, rapid temperature stabilisation**
- **Speedy operation, almost instantaneous readings**

The *Gallenkamp* EVT viscometer was developed in co-operation with the South Eastern Gas Board. The equi-viscous temperature of a tar is the temperature at which the viscosity of the tar is 50 sec STV (about 200 Stokes).



PH-620

SPECIFICATION

The sample is contained in a small cup in which a stainless steel cylinder, fitted with a graduated flywheel and suspended from a torsion wire, is free to rotate. The cup is completely immersed in a water bath fitted with a stirrer. The bath is heated by a clamped-on element which is controlled by a rheostat. The cylinder and suspension and the tar cup are mounted on a bracket which can slide vertically on a substantial rod attached to the main casting. The bracket can be locked in any position. The suspension can be locked by a rotating lever, and when so locked the cylinder and cup can be quickly detached for cleaning purposes without risk of damage to the torsion wire. The base is an aluminium casting fitted with levelling feet and stove enamelled. All other metal parts are chromium-plated and polished.

METHOD OF TEST

The correct quantity of sample, shown by a level gauge, is placed in the cup. The cup is fitted to the bracket and the sample then occupies the annular space between the cup and the cylinder. The suspension is lowered into the bath which is then slowly heated. The torsion head is periodically rotated sharply through 180°, stops being fitted for this purpose. The cylinder at first rotates slowly but as the EVT is approached it rotates more freely at each twist and eventually overswings by one division of the flywheel. The temperature at which this occurs is the EVT of the material.

PH-620

VISCOMETER, EVT, *Gallenkamp*, **electrically heated,** complete with enclosed rheostat, instructions for use and certificate of calibration issued by the South Eastern Gas Board. **Without thermometer.**

For 220/240V a.c. or d.c. supplies ...	Each	**£199·00**	*bx*
For 200/210V a.c. or d.c. supplies ...	Each	**£199·00**	*bxN*
For 110/120V a.c. or d.c. supplies ...	Each	**£199·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

PH-622	**Heater**	Each	**£2·40**	*bx*
PH-624	**Torsion wire**	Each	**£3·00**	*bx*

ACCESSORIES

TJ-154	**Thermometer, A.40C/100(STPTC T5c)**	For full details and prices see entries in List No. sequence.
TJ-154	**Thermometer, A.70C/100(STPTC T17c)**	

VISCOMETERS

BS Flow Cup	see **VS-132** et seq.
Ford Flow Cup	see **VS-140**
Universal Torsion	see **VS-010** et seq.
Zahn Flow Cup	see **VS-160**

STANDARD TAR VISCOMETERS FOR VISCOSITY OF REFINED TAR, STPTC RT2, RT3 and VISCOSITY-CUTBACK OF BITUMEN AND ROAD OIL, IP 72

PH-641

VISCOMETER, STANDARD TAR, *Seta,* **electrically heated,** comprising water bath with immersion heater, draincock, three legs with levelling feet, stirrer, thermometer collar and 10 mm cup and valve. For 230/250V a.c. or d.c. supplies. **Without thermometer.**
Each **£60·00** *fxN*

PH-641

REPLACEMENT PARTS

PH-643	**Heater,** 500W	Each	**£8·50** *fxN*
PH-644	**Cup,** with 10 mm orifice...	Each	**£15·00** *fxN*
PH-645	**Valve,** for 10 mm cup	Each	**£5·00** *fxN*

ACCESSORIES

PH-647	**'Go/no-go' gauge,** for checking orifice of 10 mm cup.	Each **£10·00** *fxN*
EC-810	**Energy regulator,** for heater control...	For full details and prices see entries in List No. sequence.
TJ-154	**Thermometer,** A.40C/100(STPTC T5c)	
TJ-154	**Thermometer,** A.70C/100(STPTC T17c)	
TK-514	**Thermometer,** IP 8F Redwood low ...	
TK-515	**Thermometer,** IP 8C Redwood low ...	

RECEIVERS, 100 ml capacity see CYLINDERS.

VISCOSITY-BITUMEN ROAD EMULSION, IP 212 and BS 434

PH-660

VISCOMETER, Engler, *Seta,* **electrically heated,** comprising gold plated oil cup with stainless steel jet, mounted in a polished brass water bath fitted with immersion heater. The oil cup with double walled lid is supported by an adjustable ring and the water bath with stirring device is mounted in a stand fitted with tripod legs with adjustable feet. A thermometer clip is fitted to the water bath and the oil cup lid has a thermometer socket. Supplied with plug valve for jet. **Without thermometers or flask.** For 100/130 or 200/250V a.c. supplies ... ... Each **£100·00** *fxN*

When ordering please state voltage and frequency of supply.

PH-660

ACCESSORIES

EC-810	**Energy regulator,** for heater control	For details and prices see entries in List No. sequence.
FK-136	**Flasks,** Kohlrausch, 200 cm^3	
SE-140	**Sieves,** 250 and 710 microns nominal aperture	
TK-640	**Thermometer,** IP 76C, two required	

PH-710

VISCOSITY—REDWOOD, IP 70

PH-710

VISCOMETER, Redwood No. 1, *Seta,* **electrically heated,** for light oils of viscosity not exceeding 2000 Redwood No. 1 seconds at the temperature of test. Comprises copper water bath with immersion heater, drain cock, stirrer with thermometer collar, silver plated oil cup with agate jet, ball valve, thermometer clip and spirit level and light alloy combined draught shield and stand, fitted with levelling screws. The cup is standardised against a cup calibrated by the National Physical Laboratory and a works certificate of test is issued.

Without thermometers or flask.

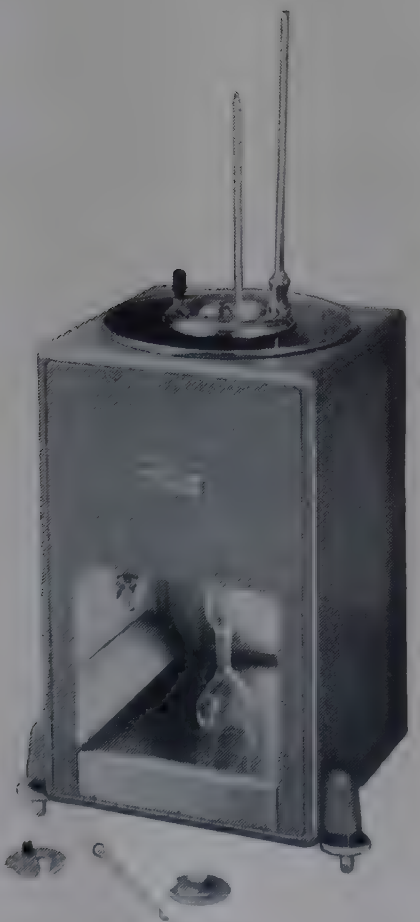
For 200/250V a.c. supplies	Each	**£80·00**	*fx*
For 100/130V a.c. supplies	Each	**£80·00**	*fx*

ACCESSORY

EC-810	**Energy regulator,** for heater control. For details and price see entry in List No. sequence.

REPLACEMENT PARTS

PH-720	**Oil cup, Redwood No. 1,** for PH-710, with works certificate of test ... ... Each **£45·00** *fxN*
PH-643	**Heater,** 500W. For price see entry in List No. sequence.



PH-740

PH-740

VISCOMETER, Redwood No. 2, *Seta,* **electrically heated,** for oils of viscosity exceeding 2000 Redwood No. 1 seconds. Comprises copper water bath with immersion heater, drain cock, stirrer with thermometer collar, silver plated oil cup with agate jet, cover, ball valve, thermometer clip and spirit level and a combined draught shield and stand fitted with levelling screws. The cup is standardised against a cup calibrated by the National Physical Laboratory and a works certificate of test issued.

Without thermometers or flask.

For 200/250V a.c. supplies	Each	**£125·00**	*fxN*
For 100/130V a.c. supplies	Each	**£125·00**	*fxN*

ACCESSORY

EC-810	**Energy regulator,** for heater control. For details and price see entries in List No. sequence.

ACCESSORIES FOR REDWOOD VISCOMETERS

FK-134	**Flask, Kohlrausch,** *Technico,* **Class B,** 50 cm^3	For details and prices see entries in List No. sequence.
FK-136	**Flask, Kohlrausch,** *Technico,* **Class A,** 50 cm^3	
TK-514	**Thermometer,** IP 8F, Redwood low	
TK-515	**Thermometer,** IP 8C, Redwood low	
TK-516	**Thermometer,** IP 9F, Redwood medium	
TK-517	**Thermometer,** IP 9C, Redwood medium	
TK-518	**Thermometer,** IP 10F, Redwood high	
TK-519	**Thermometer,** IP 10C, Redwood high	

WATER IN PETROLEUM PRODUCTS BY DISTILLATION, ASTM D95-IP 74, BS 756

see **WATER DETERMINATION.**

WATER AND SEDIMENT IN CRUDE OILS AND FUEL OILS BY CENTRIFUGE, ASTM D1796—IP 75, ASTM D91 and D96

PH-900 without cover

PH-900

CENTRIFUGE, electrically driven, with 4-place head, totally enclosed in a spun steel guard which has a detachable cover held in place by three spring clips. Maximum speed 1500 rev/min. The 4-place head can accommodate 100 cm^3 cone-shaped centrifuge tubes PH-912. For a.c. single phase supplies. With head and buckets but **without glassware.**

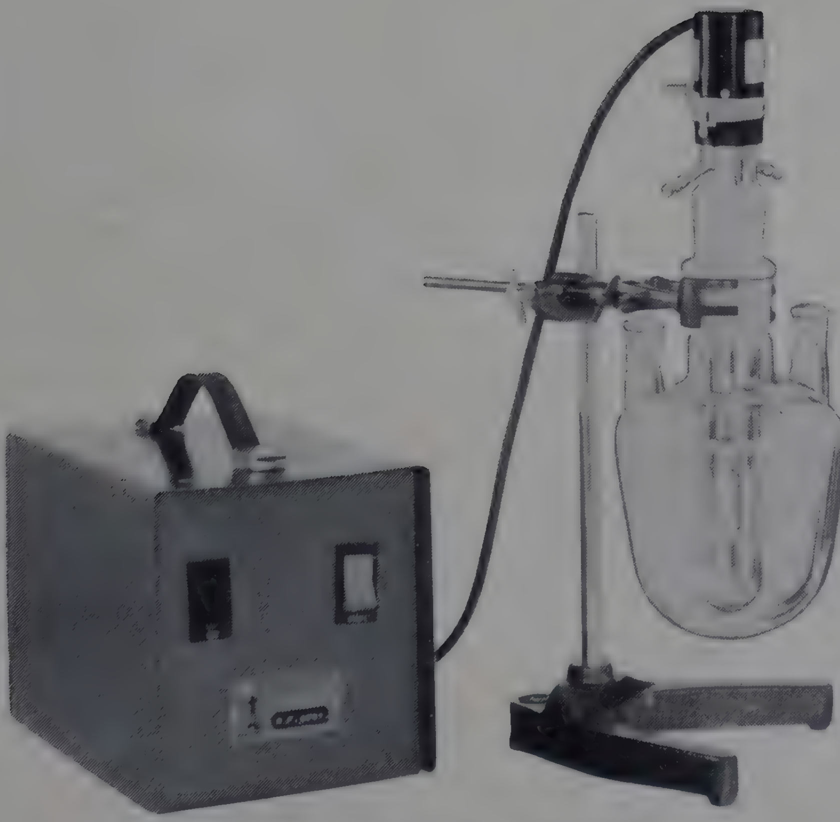
For 200/250V ... ... Each **£80·00** *fxN*
For 110/120V ... ... Each **£80·00** *fxN*

PH-912

CENTRIFUGE TUBE, cone-shaped, *Pyrex* glass, 100 cm^3, graduated, to ASTM D1796-IP 75, ASTM D91, and D96 (203 mm).

Std. pack of 6 **£8·70** Each **£1·60** *jx*

PHOTOCHEMICAL REACTOR



PK-100 with stand and clamp

PK-100

PHOTOCHEMICAL REACTOR, 1000 ml, *Hanovia*, for small scale photochemical research using ultraviolet radiation including energy at 185 nm. A three-necked glass flask, with 45/40 centre socket and 19/26 side sockets, holds a clear quartz thimble. The latter receives an inner clear quartz thimble which contains the UV lamp. The design permits water cooling of the space between the thimbles and nitrogen flushing of the lamp chamber to eliminate ozone and other gases. Both quartz thimbles have, opposite the lamp, a 75 mm long zone in high purity synthetic silica which transmits about 80% of the UV at 185 nm for a thickness of 1 mm. A medium pressure 100W mercury arc lamp is included with electrode assembly and terminal housing, and cased control containing transformer, choke and limiting resistor with connecting lead. For 200/250V 50 Hz single phase supplies only ... ... Each **£145·00** *fxN*

ACCESSORY

PK-120 **Lamp, low pressure UV,** 2W, in synthetic quartz, providing about 85% of UV output at 254 nm and 185 nm. Includes cased step-up transformer. For 200/250V 50 Hz single phase supplies only.

Each **£69·50** *fxN*

HIGH INTENSITY ULTRAVIOLET SOURCE
suitable for photochemical studies

See LH-560 in List No. sequence.

For other U.V. lamps see LH-530 et seq. in List No. sequence.

Technico PIPETTES

REGD. TRADE MARK

CONSTRUCTION

Machine drawn soda-lime glass tubing of uniform bore and ample wall thickness is used for *Technico* pipettes.

All jets have a uniform taper and wall thickness giving adequate mechanical strength, and are finished by fine grinding and bevelling in accordance with the recommendations of the appropriate British Standards.

Technico pipettes have a flow time near the minimum specified in the appropriate British Standards and thus offer a combination of speed and accuracy.

INSCRIPTIONS

All *Technico* pipettes have inscriptions of high definition and most are permanently marked with an interstitial amber stain.

COLOUR CODING

Most *Technico* pipettes are colour coded to BS 3996.

Colour coding is intended to facilitate the sorting of similar types of pipettes by unskilled personnel. It is not intended as a quick means of recognising particular capacities.

PIPETTE COLOUR CODE TO BS 3996

ONE MARK and BULB PIPETTES	
Capacity cm³	**Colour**
0·005	White
0·01	Orange
0·02	Black
0·05	Green
0·2	Red
0·5	2 Black
1	Blue
2	Orange
3	Black
4	2 Red
5	White
10	Red
15	Green
20	Yellow
25	Blue
30	Black
40	White
50	Red
100	Yellow

GRADUATED PIPETTES		
Capacity cm³	**Subdivision cm³**	**Colour**
0·1	0·001	2 Green
0·1	0·005	Red
0·1	0·01	White
0·1	0·05	2 Orange
0·2	0·002	2 White
0·2	0·01	Black
0·2	0·1	Orange
0·5	0·005	Green
0·5	0·02	2 Red
1	0·01	Yellow
1	0·1	Red
2	0·02	Black
5	0·05	Red
5	0·1	Blue
10	0·1	Orange
25	0·2	Green

NOTE:
Where two bands of colour are printed on the pipette to denote its capacity, they are printed in equal widths. When a second band of the same colour is much narrower than the first it denotes that the pipette is a graduated pipette to BS 700 type 1, i.e. a delivery pipette with zero at the mouthpiece end of the scale and the maximum capacity mark above the jet.
A plain white band or a sandblast band denotes that the pipette is designed for blow out of the last drop.

Extract from BS 1583 'One-mark pipettes'

TOLERANCES ON CAPACITY						
Nominal capacity cm³	0·5	1	2	3	4	5
Class B† tolerance ±cm³	0·01	0·015	0·02	0·03	0·03	0·03
Nominal capacity cm³	10	15	20	25	50	100
Class B† tolerance ±cm³	0·04	0·05	0·06	0·06	0·08	0·12

† Class A tolerances are nominally half the Class B figures given.

Extract from BS 700 'Graduated pipettes'

TOLERANCES ON CAPACITY					
Nominal capacity cm³	1	2	5	10	25
Subdivision cm³	0·01	0·02	0·05	0·1	0·2
Class A tolerance ±cm³	0·006	0·01	0·03	0·05	0·1
Class B tolerance ±cm³	0·01	0·02	0·05	0·1	0·2

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Technico BULB PIPETTES

REGD. TRADE MARK

to BS 1583

With permanent graduations and inscriptions in amber stain and colour coded to BS 3996
(Technical information see page 534)

PM-104

PIPETTES, *Technico,* one mark **Class B.** Colour coded.

To deliver	0·5 *	1 *	2 *	2·5†	3 cm³	
Ten	£1·80	1·80	1·80	3·60	2·40	ax
Each	£0·25	0·25	0·25	0·42	0·30	

To deliver	4	5	10	15	20 cm³	
Ten	£2·50	2·40	2·50	3·00	3·00	ax
Each	£0·31	0·30	0·31	0·36	0·36	

To deliver	25	30†	40†	50	100 cm³	
Ten	£3·50	5·30	5·30	4·40	6·20	ax
Each	£0·41	0·59	0·59	0·49	0·70	

PM-105

PIPETTES, safety, *Technico,* one mark **Class B,** with safety bulb in suction tube. Colour coded.

To deliver	5	10	20	25 cm³	
Ten	£4·00	4·40	5·20	5·60	ax
Each	£0·45	0·49	0·58	0·62	

PM-106

PIPETTES, *Technico,* one mark **Class A.** Colour coded.

To deliver	0·5 *	1 *	2	3	4	5 cm³	
Ten	£5·80	5·80	6·00	6·60	6·60	6·20	ax
Each	£0·64	0·64	0·66	0·74	0·74	0·70	

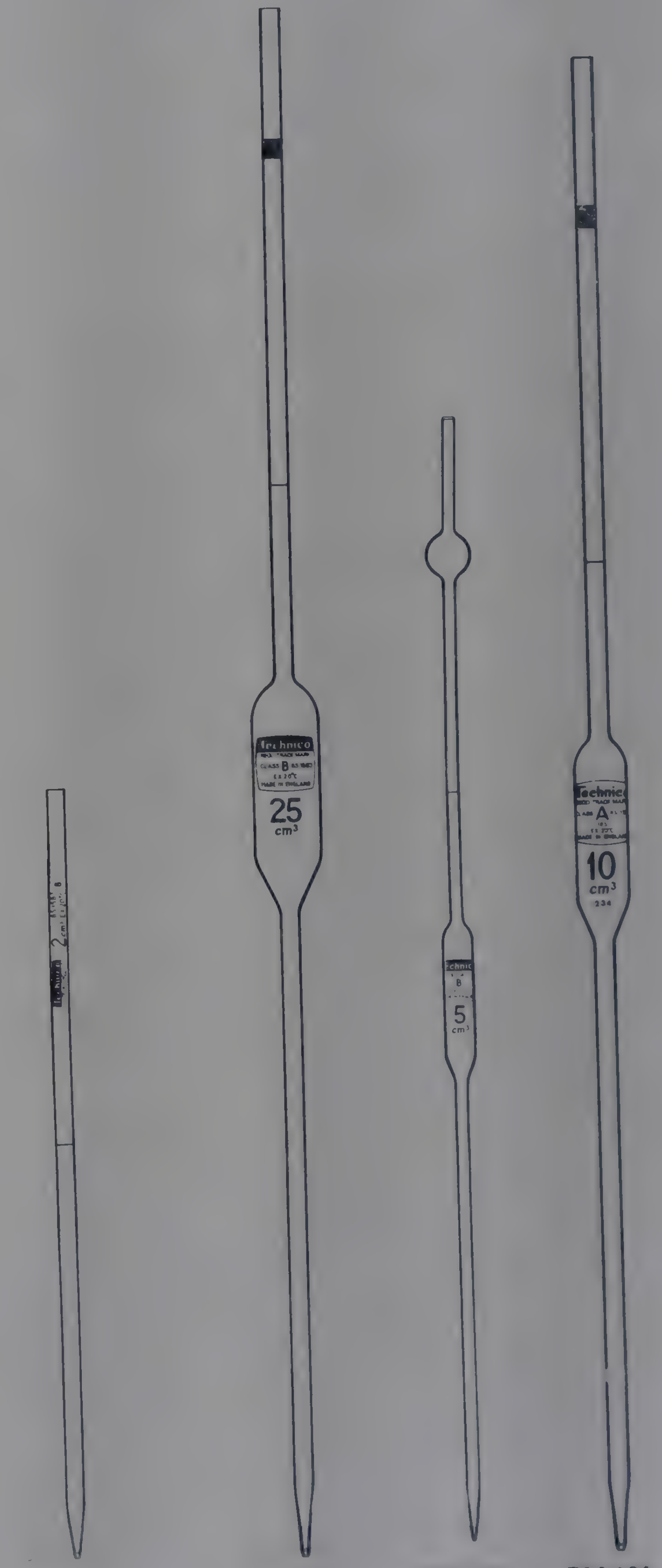
To deliver	10	15	20	25	50	100 cm³	
Ten	£6·60	8·00	8·20	8·40	9·60	13·00	ax
Each	£0·74	0·90	0·92	0·94	1·06	1·45	

PM-107

PIPETTES, *Technico,* one mark **Class A, with works certificate of examination** stating the volume delivered and the delivery time for water. Colour coded.

To deliver	0·5 *	1 *	2	3	4	5 cm³	
Ten	£8·40	8·40	8·60	9·20	9·20	8·80	ax
Each	£0·92	0·92	0·96	1·02	1·02	0·98	

To deliver	10	15	20	25	50	100 cm³	
Ten	9·20	10·20	10·80	11·00	12·20	15·60	ax
Each	£ 1·02	1·14	1·20	1·25	1·35	1·75	



PM-104
0·5 to 2 ml

PM-104
sizes
above 2 ml

PM-105

PM-106
PM-107

* **Straight pattern without bulb.**

† **Size not included in BS 1583.**

Technico GRADUATED PIPETTES

REGD. TRADE MARK

to BS 700

With permanent graduations and inscriptions in amber stain and colour coded to BS 3996
(Technical information see page 534)

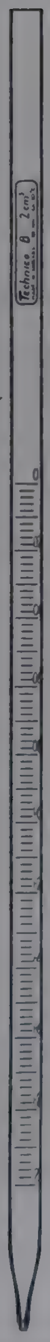
PIPETTES, type 1. Calibrated for delivery from the zero line at the top, down to any graduation line. This type is intended for operation in a similar manner to a burette and **delivery should always commence from the zero line to obtain maximum accuracy.** In order to make possible the accurate control of the meniscus by this method, these pipettes have a longer delivery time than is specified for type 2.

PIPETTES, type 2. Calibrated for delivery from any graduation line down to the jet, and intended for use to deliver a predetermined quantity by the same procedure as used for a one mark or bulb pipette. **Delivery should always be made down to the jet to obtain maximum accuracy.** These pipettes have a faster rate of flow than those of type 1.

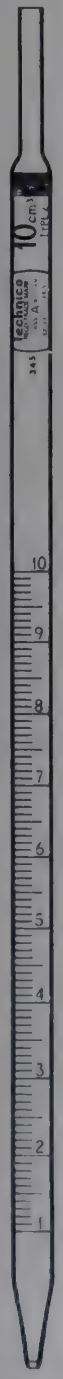
PIPETTES, type 3. Calibrated to contain a given capacity from the jet up to the graduation line corresponding to that capacity. To obtain accurate transfer, the pipette should be dry before use and the contents rinsed out into the receiving vessel.

FAST DELIVERY PIPETTES. BS 700 type 2 pipettes have the fastest flow times for which Class B accuracy can be guaranteed.

When faster flow time pipettes are required we recommend the use of ME-260 and ME-262. Details of these pipettes will be found in List No. sequence.



PM-344



PM-366

List No.	Capacity cm³		1	2	5	10	25	
	Subdivided cm³		0·01	0·02	0·05	0·1	0·2	
	PIPETTES, Type 1 for delivery from zero at top down to any graduation line.		£	£	£	£	£	
PM-344	*Technico* **Class B,** colour coded	Ten	**2·80**	**2·80**	**2·80**	**3·20**	**3·90**	*ax*
		Each	**0·34**	**0·34**	**0·34**	**0·38**	**0·45**	
PM-346	*Technico,* **Class A,** colour coded	Ten	**12·80**	**12·80**	**14·00**	**14·60**	**16·50**	*ax*
		Each	**1·45**	**1·45**	**1·55**	**1·65**	**1·85**	
	PIPETTES, Type 2 for delivery from any graduation line down to the jet.							
PM-364	*Technico,* **Class B,** colour coded	Ten	**2·80**	**2·80**	**2·80**	**3·20**	**3·90**	*ax*
		Each	**0·34**	**0·34**	**0·34**	**0·38**	**0·45**	
PM-366	*Technico,* **Class A,** colour coded	Ten	**12·80**	**12·80**	**14·00**	**14·60**	**16·50**	*ax*
		Each	**1·45**	**1·45**	**1·55**	**1·65**	**1·85**	
	PIPETTES, Type 3 for content from the jet to any graduation line.							
PM-384	*Technico,* **Class B,** colour coded	Ten	**3·20**	**3·00**	**3·20**	**3·50**	**4·60**	*ax*
		Each	**0·38**	**0·36**	**0·38**	**0·41**	**0·51**	

PIPETTE SUPPORTS

FX-546	**Pipette rack, accepts up to 26 pipettes**
FX-547	**Pipette/burette rack, accepts up to 26 pipettes and 8 burettes**
SM-310	**Pipette stand, accepts up to 12 pipettes**
SM-331	**Pipette stand, accepts up to 28 pipettes**
SM-335	**Pipette support tray, accepts up to about 30 pipettes**

For details and prices of the above see entries in List No. sequence.

COREX® PIPETTES

Gallenkamp are appointed exclusive distributors in the United Kingdom of *Corex* products manufactured by the Corning Glass Works, Corning, New York, U.S.A.

Corex® is the trademark given by Corning to laboratory glassware made from a special type of glass and treated by an ion-exchange process which strengthens the glass chemically so that it becomes many times stronger than ordinary glassware.

Corex® glassware has a greater surface hardness than ordinary glass and is better able to resist the scratching and chipping which weaken ordinary glass and are a major cause of breakage, as well as constituting a danger from cross-contamination.

Corex® graduations and inscriptions are permanent and will remain sharply legible throughout the life of the articles.

Corex® glassware is more resistant to chemical attack than ordinary borosilicate, will withstand steam sterilisation without visible clouding, and can be used up to 300°C.

VOLUMETRIC SPECIFICATIONS

Corex pipettes are manufactured to a very high quality to U.S.A specifications which are on the whole very similar to the corresponding British Standards although there are some differences in sizes and a number of minor differences in dimensions and volumetric tolerances. In accordance with U.S.A. practice, pipettes to class A accuracy are so designated, it being understood that other pipettes without designation are class B accuracy.

***PM-430**

PIPETTES, long tip, *Corex* 7064A, with permanently marked graduations from zero line at top down to full capacity above shoulder of jet.

To deliver	0·1	0·2	0·5	1	cm³
Subdivided	0·01	0·01	0·01	0·01	cm³
12	**£25·00**	**25·50**	**26·00**	**26·00**	*mx*
Each	**£ 2·35**	**2·40**	**2·45**	**2·45**	

To deliver	2	2	5	10	cm³
Subdivided	0·1	0·01	0·1	0·1	cm³
12	**£26·50**	**32·00**	**27·50**	**32·00**	*mx*
Each	**£ 2·50**	**3·00**	**2·55**	**3·00**	

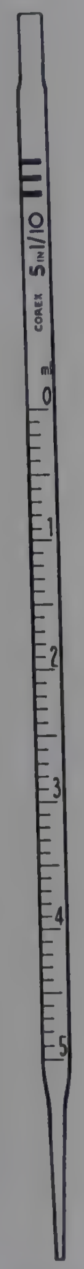
***PM-435**

PIPETTES, Mohr type, *Corex* 7065A, with permanently marked graduations from zero line at top down to full capacity above shoulder of jet.

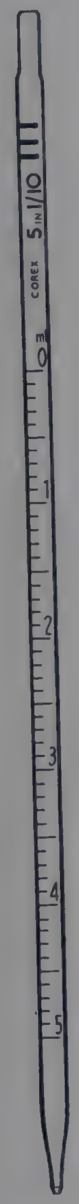
To deliver	0·1	0·2	1	1	cm³
Subdivided	0·01	0·01	0·1	0·01	cm³
12	**£16·50**	**17·60**	**16·00**	**17·60**	*mx*
Each	**£ 1·55**	**1·65**	**1·50**	**1·65**	

To deliver	2	5	10	cm³
Subdivided	0·1	0·1	0·1	cm³
12	**£17·60**	**19·80**	**20·50**	*mx*
Each	**£ 1·65**	**1·85**	**1·90**	

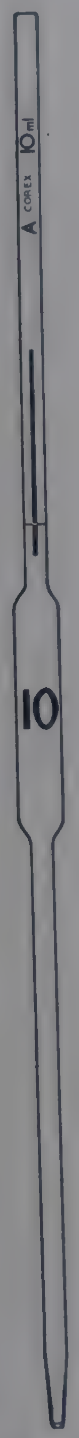
SEROLOGICAL PIPETTES, *Corex,* see ME-350, ME-352, ME-365 in List No. sequence.



PM-430



PM-435



PM-460

***PM-460**

PIPETTES, transfer, Class A, *Corex* 7100A, with permanently marked graduation line and bold clear figures.

To deliver	1	2	3	4	5 cm³	
Std. pack qty.	12	12	12	12	12	
Pack	**£19·80**	**19·80**	**19·80**	**19·80**	**19·80**	*mx*
Each	**£ 1·85**	**1·85**	**1·85**	**1·85**	**1·85**	

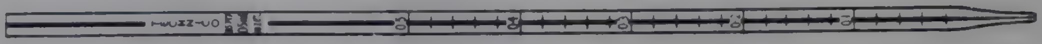
To deliver	10	15	20	25	50 cm³	
Std. pack qty.	12	6	6	6	6	
Pack	**£22·00**	**16·50**	**20·40**	**21·00**	**26·00**	*mx*
Each	**£ 2·05**	**3·00**	**3·70**	**3·80**	**4·70**	

Technico MICRO PIPETTES

REGD. TRADE MARK

to BS 1428 Part D4

Colour coded to BS 3996
(Technical information see page 534)



PM-496

PIPETTES, Type 1, subdivided, calibrated for delivery from the zero mark at the top down to any graduation mark.

Type 2, subdivided, calibrated for content from the jet up to any graduation mark.

List No.						
	Capacity	cm³	0·1	0·2	0·5	
	Subdivided	cm³	0·005	0·01	0·02	
	Tolerance ±	cm³	0·002	0·004	0·006	
PM-486	*Technico* **Type 1,** for delivery	Ten	**£4·60**	**4·70**	**4·40**	*ax*
		Each	**£0·51**	**0·52**	**0·49**	
PM-496	*Technico* **Type 2,** for content	Ten	**£4·40**	**4·60**	**4·60**	*ax*
		Each	**£0·49**	**0·51**	**0·51**	

PIPETTES, Type 3, one mark calibrated for content.
Type 4, two marks calibrated for content.

List No.		*Technico* **Type 3**				**Type 4**		
	Capacity cm³	0·005	0·01	0·02	0·05	0·1	0·2	
	Tolerance ± cm³	0·0002	0·0002	0·0004	0·001	0·002	0·004	
PM-506	Ten	**£3·50**	**3·40**	**3·40**	**3·40**	**3·70**	**3·70**	*ax*
	Each	**£0·41**	**0·40**	**0·40**	**0·40**	**0·43**	**0·43**	

MICRO PIPETTES

PIPETTES, micro, *E-MIL*, Lang Levy pattern, with automatic zero.

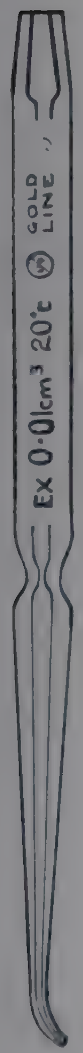
Capacity	10	20	25	50	100	150	200	250 λ	
Delivery tolerance ±	0·5	1	1	1	2	3	4	5 λ	
Content tolerance ±	0·3	0·4	0·5	0·5	1	1·5	2	2·5 λ	
PM-526 Calibrated for delivery									
Std. pack of 12	**£8·40**	**8·40**	**8·40**	**8·40**	**8·40**	**9·36**	**8·40**	**8·40**	*jx*
Each	**£0·78**	**0·78**	**0·78**	**0·78**	**0·78**	**0·88**	**0·78**	**0·78**	
PM-536 Calibrated for content									
Std. pack of 12	**£8·40**	**8·40**	**8·40**	**8·40**	**8·40**	**9·36**	**8·40**	**8·40**	*jx*
Each	**£0·78**	**0·78**	**0·78**	**0·78**	**0·78**	**0·88**	**0·78**	**0·78**	

PM-546

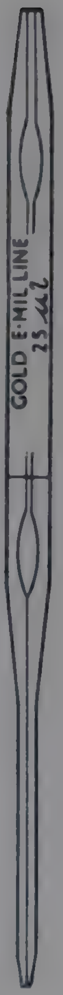
PIPETTES, ultramicro, *E-MIL*, Kirk pattern.

To contain	5	10	25	50	100 λ	
Tolerance ±	0·03	0·05	0·15	0·15	0·3 λ	
Std. pack of 12	**£9·36**	**9·36**	**10·80**	**10·80**	**10·80**	*jx*
Each	**£0·88**	**0·88**	**1·00**	**1·00**	**1·00**	

NOTE: PM-526, PM-536, PM-546.
These pipettes are calibrated in Lambda (λ) units.
1λ—1 mm³—0·001 cm³



PM-526
PM-536



PM-546

PM-566

PM-566

PIPETTE, MICROMETER SYRINGE, *Agla*, comprising a 0·5 cm³ all-glass hypodermic syringe with Luer nozzle, attached by a rigid holder to a micrometer screw which operates the piston. The micrometer head is direct reading to an accuracy of 0·00005 cm³. Supplied with hypodermic needle, straight glass capillary needle, bent glass capillary needle and retort stand mounting attachment ... ... Each **£20·00** *fx*

REPLACEMENT PARTS

PM-568	**Glass syringe,** comprising barrel and piston, with Luer nozzle ...	Each	**£5·70**	*fx*
PM-569	**Hypodermic needle,** Luer fitting	Each	**£0·20**	*fx*
PM-570	**Glass capillary needle,** straight pattern, Luer fitting	Each	**£1·10**	*fx*
PM-571	**Glass capillary needle,** right angle pattern, Luer fitting ...	Each	**£1·30**	*fx*

ACCESSORIES

PM-575	**Constant drop volume nozzle** complete with syringe ...	Each	**£5·10**	*fx*
SM-610	**Bosshead,** *Technico*, for use with PM-573. For price see entry in List No. sequence.			

DROPPING PIPETTES

PM-580

PIPETTES, dropping, (AG), ungraduated, with teats. In packs of 10.

Capacity approx.	1	4 ml
10 packs	£12·60	20·00 *ax*
Pack	£ 1·40	2·25

PM-584

PIPETTE, dropping, *Technico*, graduated 1 cm³ in 0·1 cm³, with teat ... Ten **£3·40** Each **£0·40** *ax*

SAFETY PIPETTES

A range of pipettes the upper end of which is a hollow piston on which slides a barrel with finger vent at the top. The pipette is filled above the mark by pumping and then finger operated in the normal way.

To deliver		1	2	5	10	25 cm³	
Syringe capacity		2	2	5	10	10 cm³	
PM-624 **PIPETTES,** *Exelo*, **one mark**	Ten	**£14·90**	**14·90**	**18·40**	**22·00**	**22·30**	*fx*
	Each	**£ 1·75**	**1·75**	**2·16**	**2·59**	**2·62**	
PM-634 **PIPETTES,** *Exelo*, **graduated**	Ten	**£17·40**	**17·40**	**20·00**	**24·10**	**25·40**	*fx*
	Each	**£ 2·05**	**2·05**	**2·35**	**2·83**	**2·99**	

PM-105

PIPETTES, *Technico*, with safety bulb in suction tube. For details and prices see entry in List No. sequence.

PIPETTE FILLER

PM-660

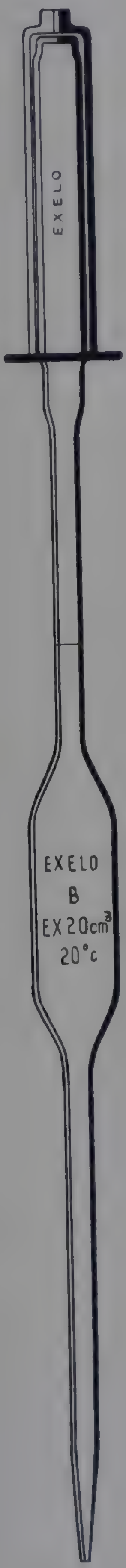
PIPETTE FILLER, *Griffin*. Comprising a moulded rubber bulb, approx. 60 ml capacity, fitted with 3 glass ball valves which can be controlled by pressure between finger and thumb. There are no metal parts to corrode and the filler can be used for all liquids except those which attack rubber.

Can be used on bulb or cylindrical pipettes from 2 cm³ up to 50 cm³ capacity... ... Ten **£12·00** Each **£1·35** *mx*

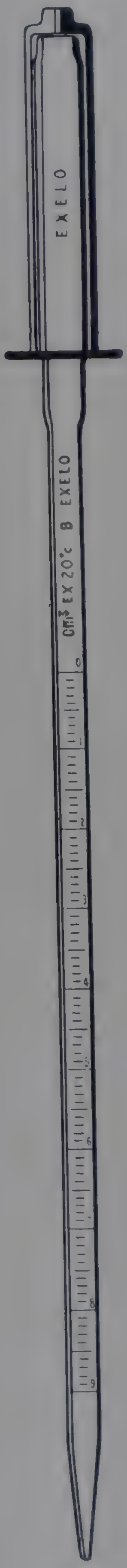
ULTRASONIC CLEANER FOR PIPETTES

- **Stainless steel bath 45 cm deep**
- **Built-in heater and thermostat**

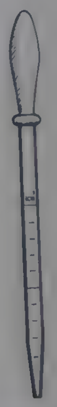
For full details and prices see UL-150 in List No. sequence.



PM-624



PM-634



PM-584

PM-660

Technico AUTOMATIC PIPETTES

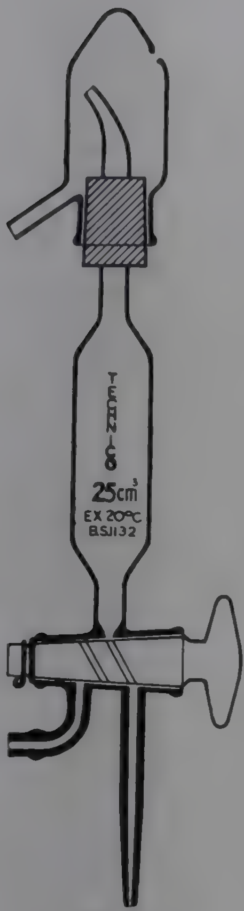
REGD. TRADE MARK

PM-664

PIPETTES, Dafert automatic, *Technico,* to BS 1132, complete with overflow bulb fitted with rubber stopper. Stopcock fitted with retaining spring.

To deliver	5	10	25	50	100 cm³	
Tolerance ±	0·06	0·08	0·12	0·15	0·25 cm³	
Ten	**£25·00**	**26·00**	**27·00**	**31·00**	**35·00**	*ax*
Each	**£ 2·80**	**2·90**	**3·00**	**3·40**	**3·90**	

Spare retaining springs for stopcocks of above pipettes see ST-650 in List No. sequence.

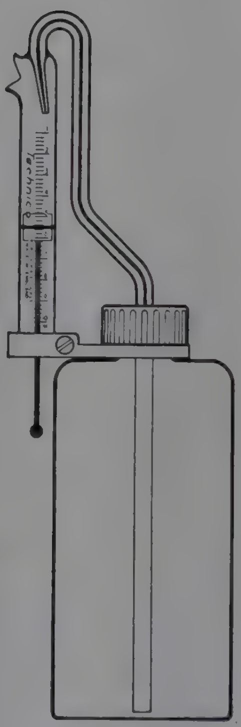


PM-664

PM-680

PIPETTES, auto-dispensing, *Technico.* Adjustable capacity pipettes with plastics reservoirs for the rapid dispensing of pre-set volumes of liquids. Comprises a graduated glass barrel with piston fitted with a silicone rubber sealing ring. A siphon tube on the pipette provides automatic zero adjustment. The pipette is mounted on a polythene bottle. By squeezing the bottle, the liquid rises in the pipette to a little above the zero mark and excess liquid is sucked back by the siphon tube when the bottle is released. The pre-set volume may then be poured out.

Capacity	10	50 cm³	
Subdivision	0·2	1 cm³	
Bottle capacity	600	1200 ml	
Ten	**£28·00**	**40·00**	*ax*
Each	**£ 3·10**	**4·40**	



PM-680

REPLACEMENT PART

PM-681 **Main glass part,** with graduated barrel.

Capacity	10	50 cm³	
Ten	**£20·00**	**29·00**	*ax*
Each	**£ 2·25**	**3·20**	

PM-704

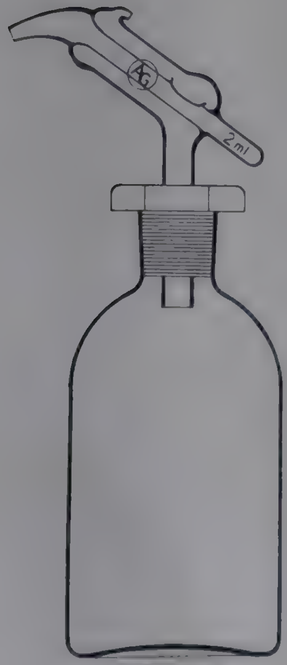
PIPETTES, (AG), automatic tilting, for rapid dispensing of replicate volumes with approximate accuracy.

To deliver	1	2	5	10 ml	
Ten	**£10·00**	**9·80**	**10·20**	**11·40**	*ax*
Each	**£ 1·12**	**1·10**	**1·14**	**1·30**	
To deliver	15	20	25	50 ml	
Ten	**£12·80**	**14·40**	**15·40**	**17·40**	*ax*
Each	**£ 1·45**	**1·60**	**1·75**	**1·95**	

PM-714

PIPETTES, (AG), as PM-704 but fitted with a 24/29 polythene stopper suitable for fitting to any reagent bottle or flask with a 24/20 or 24/29 ground neck. Complete with 500 ml reservoir bottle.

To deliver	1	2	5	10 ml	
Ten	**£13·60**	**13·40**	**13·80**	**15·00**	*ax*
Each	**£ 1·50**	**1·50**	**1·55**	**1·70**	
To deliver	15	20	25	50 ml	
Ten	**£16·40**	**18·00**	**19·00**	**21·00**	*ax*
Each	**£ 1·85**	**2·00**	**2·15**	**2·35**	



PM-714

AUTOMATIC DISPENSING PIPETTES

PM-755

PIPETTES, AUTO DISPENSING, *E-MIL Pressmatic,* for the rapid dispensing of preset volumes of liquids. The pipette delivers when the syringe plunger is depressed and refills automatically when the plunger is released. The volume dispensed is set by a simple screw clamp. Suck-back is prevented by a glass non-return valve and the liquid contacts only glass, ptfe, FEP and Viton components. Supplied complete with 1 litre low actinic glass reservoir bottle.

Capacity	5	10 cm^3	
Type No.	5DAF	10DAF	
Each	**£14·50**	**14·50**	*jx*

REPLACEMENT PARTS

PM-757 **Kit of Spares,** comprising barrel and plunger, valve closures ptfe and Viton washers, silicone rubber rings and screw cap.

Type No.	5DAF/R	10DAF/R	
Each	**£3·00**	**3·00**	*jx*

PM-755

PM-764

LIQUID DISPENSER, automatic, *Super-Spenser,* comprising a standard 5 cm^3 or 10 cm^3 glass syringe with ptfe plunger, driven by a synchronous motor. Delivery is adjustable either from 0·5 to 5 cm^3 or 0·5 to 10 cm^3 with a reproducibility within ±0·1%. A fluorocarbon valve ensures that no liquid flows back into the syringe and a Perspex window permits the syringe mechanism to be seen in operation. Liquid inlet and outlet nozzles, a press button for single cycle operation and an adaptor for foot switch accessory are provided. Overall dimensions 28×10 ×14 cm. Weight 2·8 kg. Complete with one glass syringe. and instruction for use. For 220/240V 50 Hz supplies.

Syringe capacity	5	10 cm^3	
Deliveries per minute	10	10	
Each	**£58·63**	**58·63**	*fx*

REPLACEMENT PARTS AND ACCESSORIES

PM-766 **Foot switch assembly** ... ... Each **£4·75** *fxN*

PM-769 **Syringes, glass with ptfe plunger.**

Capacity	5	10 cm^3	
Each	**£2·00**	**2·25**	*mx*

SUPER-SPENSER
START
POWER
FOOT SWITCH

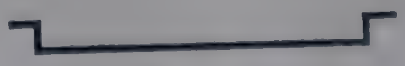
PM-764

PLANCHETS

PP-100

PLANCHET, flat aluminium source tray for lead castles. Overall dia. 26 mm, inside dia. 23 mm, depth 1·75 mm.

In pack of 100 ... ... 10 packs **£17·00** *cx*
Pack **£1·90**

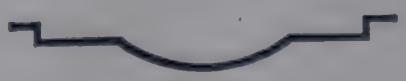


PP-100

PP-104

PLANCHET, as PP-100 but dimpled. In pack of 100.

10 packs **£17·00** *cx*
Pack **£1·90**



PP-104

PLANIMETERS

PP-220

PP-220

PLANIMETER, Allbrit, fixed index pattern for area measurement. With press button zero setting, measuring wheel carriage with integral magnifier, pivoting pole arm and fixed length tracer arm. Measures full scale areas up to 22 in diameter with pole inside or up to 7·5 in diameter with pole outside area being traced; accuracy approx. ±0·5%. For areas other than full scale conversion tables must be used. In case with instructions, checking rule and area conversion table Each **£38·06** *mx*

PP-240

PLANIMETER, Allbrit, sliding bar pattern for area measurement. With press button zero setting, pivoting pole arm and measuring wheel carriage which can be moved along the calibrated tracer arm to give direct reading of area independent of scale. The measuring carriage has an integral magnifier. Measures full scale areas up to 28 in diameter with pole inside and 12·5 in diameter with pole outside area being traced; accuracy approx. ± 0·5%. In case with instructions, checking rule and calibration tables for English and Metric scales.
Each **£45·98** *mx*

PLASTICS MATERIALS

General properties of common synthetic resins. (Common names and abbreviations in accordance with BS 3502.)
Apart from their susceptibility to chemical attack, plastics can also be very sensitive to their environments. Strong sunlight or low concentrations of organic vapours can be sufficient to cause superficial crazing or even complete failure, usually along undetectable lines of internal strain. Most often affected in this way are acrylic, polystyrene, and polythene but generally this potential disadvantage is outweighed by the advantages of mechanical strength and low price.

Type of resin	Usual mechanical properties and appearance	Approx. max. working temp. °C	Flammability	Sterilisation		Attacking reagents	
				Air at 160°C	Steam at 121°C	Water, acids and alkalis	Common organic solvents
Polythene, low density	Flexible, opaque	90	Slow burning	No	No	Oxidising acids (conc.)	Hydrocarbons and chlorinated hydrocarbons particularly above 60°C
Polythene, high density	Semi-rigid, opaque	110	Slow burning	No	No	Oxidising acids (conc.)	
Polypropylene	Rigid, translucent	140	Slow burning	No	Yes	Oxidising acids (conc.)	Hydrocarbons and chlorinated hydrocarbons particularly above 80°C
TPX (polymethylpentene)	Rigid, clear or pigmented	180	Slow burning	Yes	Yes	Oxidising acids (conc.)	Hydrocarbons and chlorinated hydrocarbons
PVC, rigid (vinyl)	Rigid, pigmented	70	Self extinguishing	No	Some grades	None	Ketones, cyclic ethers, chlorinated hydrocarbons and deplasticising solvents
PVC, plasticised (vinyl)	Very flexible, clear or pigmented	50	Self extinguishing	No	Some grades	Slight water absorption	
Polystyrene	Brittle, clear	85	Slow burning	No	No	Oxidising acids (conc.)	Most
Acrylic (Perspex, PMM)	Rigid, brittle, clear	70	Slow burning	No	No	Conc. acids	Ketones, esters and chlorinated hydrocarbons
Polycarbonate	Rigid, clear	130	Very slow burning	No	Yes	Conc. acids and alkalis (slight attack)	All except aliphatic hydrocarbons
Nylon (Polyamide)	Rigid, opaque	120	Self extinguishing	No	Yes	Water (absorbed) and acids	Phenols
Ptfe	Rigid, opaque	300	Non-flammable	Yes	Yes	None	None
Melamine	Rigid, pigmented	110	Non-flammable	No	No	Conc. acids and alkalis	None

PLASTICS SUNDRIES

(All dimensions given are nominal)

See also entries under page heading Rubber and Plastics Sundries

SEALING MATERIALS

PP-495

SEALING COMPOUND, silicone rubber, which cures at room temperature to a rubber suitable for sealing purposes and for making flexible joints between glass components. The cured rubber is flexible between −60 and +300°C. Supplied in collapsible tube containing 85 g.

Each **£0·85** *mx*

PP-522

SEALING TISSUE, *Gallenkamp Parafilm*, a flexible, single-way stretch, waterproof, thermoplastic material formulated for use in a wide range of ambient temperatures. Once wrapped round an article, it can be sealed into position by the heat and pressure of the hand. It can be used to seal irregularly shaped articles. *Parafilm* is resistant to most common dilute acids, alkalis and inorganic solutions and it has a low water vapour permeability. In 15 metre rolls, interleaved with paper to prevent sticking. Each roll is individually sealed and wrapped.

Width	5	16·5	50 cm	
10 rolls	**£4·20**	—	—	*bx*
3 rolls	—	**4·40**	**12·60**	
Roll	**£0·49**	**1·55**	**4·40**	

***PP-524**

SEALING TISSUE, *Parafilm M*, similar to PP-522 but having two-way stretch properties. In rolls interleaved with paper to prevent sticking.

Width	10	50 cm	
Length	38	7·5 metres	
Roll	**£2·80**	**2·80**	*mx*

PP-525

SEALING TAPE, ptfe, which can easily be stretched over stoppers and ground joints or the mouths of tubes, bottles etc. The tape can be sterilised in steam. In 10 metre rolls.

Width	5	10 cm	
Roll	**£1·90**	**3·60**	*cx*

POLYTHENE FILM

PP-532

FILM, polythene, 500 gauge, 0·13 mm thick, for wrapping and storage of instruments and general apparatus.

Width	120	180 cm	
10 metres	**£1·00**	**1·20**	*cx*
Metre	**£0·17**	**0·19**	

POLYTHENE FILM ENVELOPES

PP-540

ENVELOPES, polythene film, 150 gauge, 0·04 mm thick. These envelopes can be sealed with a hot iron. In packs of 100.

Size	7·5×12·5	10×15	12·5×20 cm	
10 packs	**£2·20**	**2·50**	**2·60**	*cx*
Pack	**£0·29**	**0·31**	**0·32**	
Size	17·5×23	20×30	25×38 cm	
10 packs	**£3·00**	**4·00**	**5·70**	*cx*
Pack	**£0·36**	**0·45**	**0·64**	

For suitable sealing iron see PP-770 in List No. sequence.

PP-544

BAGS, polythene film, re-sealable. These bags are made with a rim/channel sealing device which can be closed by finger pressure and reopened repeatedly. The closure (on the shorter dimension of the bag) is reasonably dustproof but not guaranteed airtight. With write-on panel. In packs of 100.

Size	9×11·5	10×14	12·5×18·5 cm	
10 packs	**£7·00**	**9·00**	**12·20**	*cx*
Pack	**£0·78**	**1·00**	**1·35**	

POLYTHENE POWDER

PP-560

POWDER, polythene, high density, white, for applying protective coatings. The article to be coated should be pre-heated to temperatures between 170 and 300°C and rolled in the powder. Any loose dust is shaken off and the surface then fused to a smooth coat at 170°C. In pack of 500 g.

Ten packs **£7·40** Pack **£0·82** *bx*

NOTE: This material is suitable for the preparation of pressed polythene disks for Infrared Spectroscopy as described by B. Smethurst and D. Steele in Spectrochimica Acta 1964. **20(^{2}) 242.**

SHEET

PP-610

SHEET, PVC, transparent. Size 122×61 cm; thickness 0·5 mm … … … … … Each **£3·00** *cx*

PP-614

SHEET, polycarbonate, transparent. Size 100×61 cm; thickness 3 mm … … … … Each **£8·40** *cx*

PP-624

SHEET, *Perspex*, colourless transparent. In rectangular pieces 75×50 cm.

Thickness	3	5	6 mm	
Each	**£2·50**	**3·20**	**4·00**	*cx*

PP-630

SHEET, polythene, porous. Average pore size 50 microns. Suitable for gas or liquid filtration or dispersion and as a support plate in chromatography columns. Can be cut and welded. Sheet size 25×25×0·2 cm.

Each **£1·60** *cx*

ADHESIVE TAPES

PP-740

TAPE, cellulose, transparent, for sealing, masking, fastening and strengthening. In 30 metre roll 2·5 cm wide on 2·5 cm dia. core … … Roll **£0·30** *cx*

PP-744

TAPE, PVC, transparent, a thin flexible tape for masking, protecting and sealing. In 30 metre roll on 2·5 cm dia. core.

Width	1·9	2·5 cm	
Roll	**£0·45**	**0·50**	*cx*

PP-748

MASKING TAPE, a robust paper adhesive tape which is easily removed after use. Applications include masking, binding, wrapping and labelling. In 55 metre roll 2·5 cm wide … … … … … Roll **£0·45** *cx*

PLASTICINE

PP-760

PLASTICINE, a plastic moulding clay.

10 lbs **£2·10** 1 lb **£0·28** *cx*

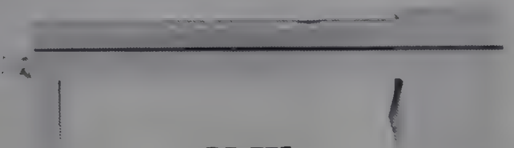
PP-770

PP-770

SEALING IRON, for sealing polythene and other thermoplastics films. A 30W element heats a shaped sole adequately to form 3 mm wide seals. The films to be welded are placed between two layers of barrier tape and the iron is drawn across the surface of the upper layer. Supplied with mains cable, roll of barrier tape and a bench rest. For 230/250V supplies ... Each **£5·00** *fx*

REPLACEMENT PART

PP-772 **Barrier tape** ... ... Roll of 1 m **£1·05** *fx*



PP-775

PP-775

SEALER, bench mounting, for making seams between thermoplastics films by fusion. Suitable for sealing polythene bags, joining PVC film etc., up to a total thickness of 0·5 mm and a maximum width of 300 mm. The films to be seamed are placed over the lower bar and the upper bar is depressed firmly. This action switches on a low voltage heater and an indicator light for an adjustable pre-determined brief period. With overload protection device and mains cable. For 220/240V a.c. single phase supplies ... ... Each **£8·70** *mx*

PP-780

***PP-780**

WELDING TORCH, for welding polythene, PVC or other thermoplastics. The torch operates on bottled butane or propane gas and the combustion gases serve as the heat vehicle for welding. This avoids the necessity of having a compressed air or nitrogen supply and the torch is easier to manipulate with only one gas hose. The torch is fitted with a gas control valve and must be used with a regulator giving a gas pressure of 1 kgf/cm². Supplied complete with four interchangeable jet tubes, 2 metres flexible hose with unions and instructions manual ... ... Each **£23·00** *cx*

ACCESSORY

GD-531 **Pressure regulator** with inlet for propane gas cylinders. For price and details see entry in List No. sequence.

PP-792

WELDING ROD, polythene, 3 mm diameter. In coil of 90 metres ... ... Each **£2·70** *cx*

PLATES

PR-310

PLATES, unglazed porous porcelain, circular with shallow rim. For drying crystals, etc. In packs of 10.

Top dia.	10	15 cm	
10 packs	**£28·00**	**51·00**	*bx*
Pack	**£ 3·10**	**5·70**	

PR-346

PLATES, white ceramic, square, edges smooth and bevelled. Thickness approx. 6 mm. In packs of 5.

Side	10	15 cm	
10 packs	**£3·20**	**5·60**	*cx*
Pack	**£0·38**	**0·62**	

PR-355

PLATE, spot test, *Royal Worcester* porcelain, glazed, with twelve cavities. Dimensions 11·5×8·5 cm. Each **£0·52** *mx*

PR-365

PLATE, spot test, rigid PVC, white, with twelve cavities. Dimensions 11·5×9·5 cm. Ten **£2·20** Each **£0·29** *mx*

SINTAGLASS **PLATES**

Porosities **0 to 4**
Diameters **10 to 40 mm**

For details and prices see SF-500 et seq. in List No. sequence.

PLATINUM

PR-660

PLATINUM FOIL. Width 25 mm, thickness 0·05 mm. Per cm length **£1·50** *cx*

***PR-680**

PLATINUM WIRE.

Thickness	0·127 0·005	0·229 0·009	0·305 0·012	0·381 0·015	0·508 mm 0·020 in	
Per 10 cm	**£0·35**	**0·55**	**0·90**	**1·20**	**2·40**	*cx*

Thickness	0·635 0·025	0·762 0·030	0·889 0·035	1·015 mm 0·040 in	
Per 10 cm	**£3·20**	**5·00**	**6·50**	**8·50**	*cx*

CX-570

PLATINUM-IRIDIUM WIRE, 10% platinum alloy, 0·5 mm dia.

For price see entry in List No. sequence.

CX-560

WIRE HOLDER, for wire up to 0·635 mm dia. For details and price see entry in List No. sequence.

PLATINUM, basins see BASINS
PLATINUM, crucibles see CRUCIBLES

POLARIMETERS

MODEL D

For testing sugar solutions and other optically active liquids.

PRINCIPLE

The polarimeter comprises a pair of polarisers arranged in line, one of which can be rotated with respect to the other, the amount of rotation being measured by a divided circle. When the polarising planes are mutually perpendicular, no light is transmitted but, on introduction of a tube containing optically active liquid, transmitted light is seen to an extent measured by the rotation of one polariser to a position where light is no longer transmitted.

The instrument is fitted with a 10 cm diameter glass circle which has a 360° angular scale subdivided at intervals of 1° and an International Sugar Scale −30° to +130° ISS subdivided to 1° ISS. Further subdivision is by means of a divided drum which enables the angular scale to be read to 0·05 and the sugar scale to 0·1° ISS. The instrument takes tubes up to 220 mm length and is intended for use with sodium light, a suitable filter being included in the optical system.

PS-430 with lamp PS-475

PS-430

POLARIMETER, *B & S,* **Model D2,** as specification, with angular scale, International Sugar Scale, variable half shadow polariser and one 200 mm tube PS-512. Each **£195·00** *fxN*

PS-435

POLARIMETER, *B & S,* **Model D4,** as specification, with angular scale, International Sugar Scale, front focusing, fixed half shadow and one 200 mm tube PS-512. Can be used with turbid solutions ... Each **£195·00** *fxN*

ACCESSORIES

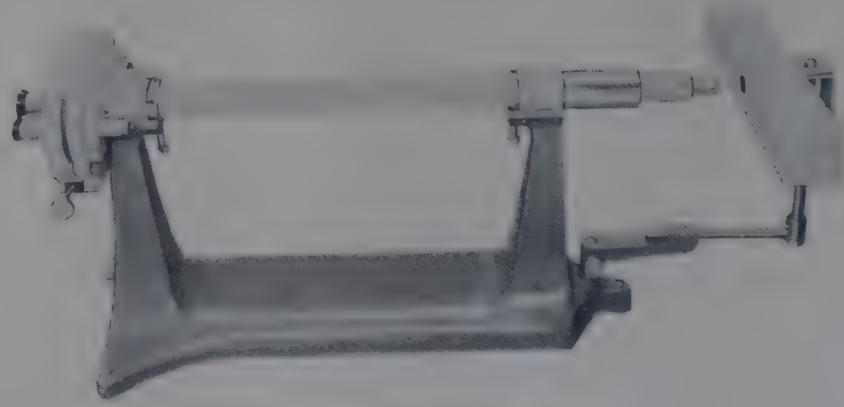
LH-400	**Sodium lamp,** *Gallenkamp,* bench mounting	For details and prices see entries in List No. sequence.
PS-475	**Sodium lamp,** for mounting on base of PS-430 and PS-435 ...	
PS-510 to PS-518	**Polarimeter tubes**	

MODEL A

For routine precision polarimetric measurements.

The polariser is a variable half shadow of the Lippich design and the angle between the two planes can be varied and locked between zero and 20°.

The analyser has a divided glass circle with double vernier reading to 0·01°. Three telescopes are provided, the central telescope is used to examine the field of the polariser and the two outer telescopes are used to observe the divided circle.



PS-450 with lamp PS-475

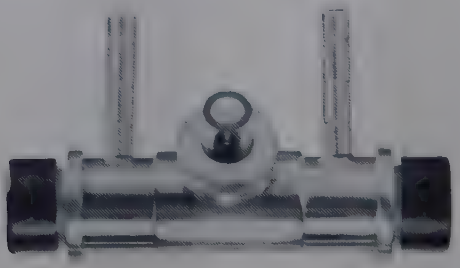
PS-450

POLARIMETER, *B & S,* **Model A No. P1,** as specification, for tubes up to 400 mm length, reading by double vernier to 0·01°. Fitted with variable half shadow polariser adjustment. **Without tube...** Each **£385·00** *fxN*

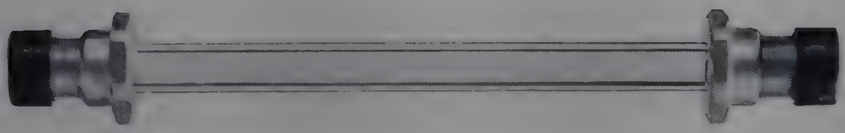
ACCESSORIES

PS-475	**Sodium lamp,** 45W, with jacket and transformer, for mounting on base PS-430, PS-435 and PS-450. For 220/240V 50 Hz single phase supplies. **When ordering please state for which polarimeter.** Each **£38·00** *fxN*

LH-400	**Sodium lamp,** *Gallenkamp,* bench mounting	For details and prices see entries in List No. sequence.
PS-510 to PS-518	**Polarimeter tubes**	



PS-510



PS-512

Gallenkamp

SODIUM LAMP

- 45W discharge tube
- Height of aperture adjustable
- Transformer in ventilated base

For full details and prices see LH-400 in List No. sequence.

POLARIMETER TUBES

(Nominal bore 8 mm)

PS-510

POLARIMETER TUBES, glass, cementless, water jacketed and centre filling suitable for inversion measurements and other measurements where temperature control is required. With 15·5 mm dia. glass cover disks.

Tube length	100	200	400 mm	
Each	**£25·00**	**25·00**	**25·00**	*fx*

PS-512

POLARIMETER TUBES, glass, with screw on end caps and 15·5 mm dia. glass cover disks.

Tube length	100	200	400 mm	
Each	**£4·00**	**4·00**	**4·00**	*fx*

PS-514

POLARIMETER TUBES, glass, as PS-512 but with bulb to clear bubble from field of view.

Tube length	100	200	400 mm	
Each	**£5·00**	**5·00**	**5·00**	*fx*

PS-516

POLARIMETER TUBES, glass, as PS-512 but with straight centre filler.

Tube length	100	200	400 mm	
Each	**£5·00**	**5·00**	**5·00**	*fx*

PS-518

POLARIMETER TUBES, glass, as PS-512 but with cup shape centre filler.

Tube length	100	200	400 mm	
Each	**£6·00**	**6·00**	**6·00**	*fx*

REPLACEMENT PARTS

PS-520	**Glass cover disks,** diameter 15·5 mm.	Ten	£4·15	*fx*
PS-525	**Rubber washers,** diameter 15·5 mm.	Ten	£0·85	*fx*

POLARISING FILTERS

PS-560

POLARISING FILTER, flexible plastics, 7·5 cm square, for laboratory experiments and demonstrations, giving a high and uniform degree of polarisation. The squares can be trimmed easily with scissors or a sharp blade ... ... Each **£1·30** cx

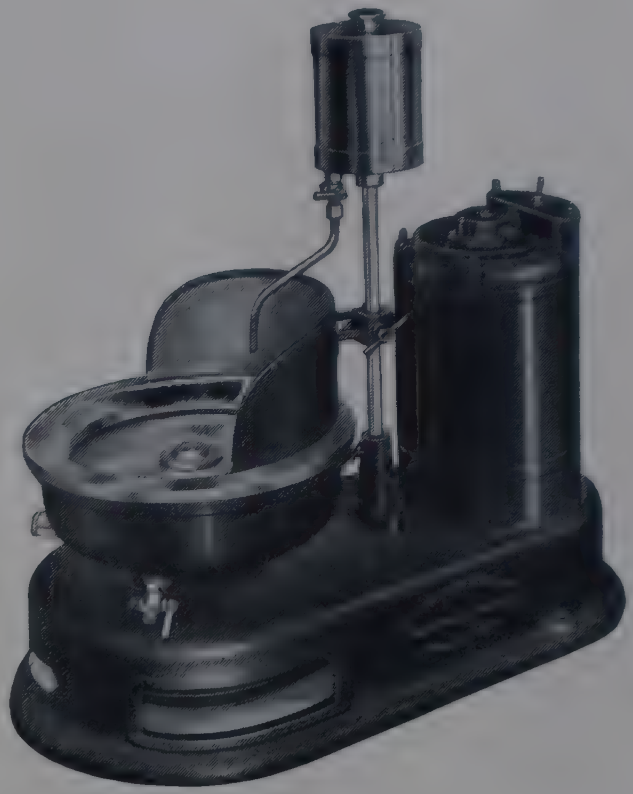
PS-565

POLARISING FILTER, mounted between plane glass disks of 45 mm diameter, for applications where a high optical quality is required, giving a uniform degree of polarisation ... ... Each **£4·30** cx

POLISHING MACHINE

PS-810

POLISHING MACHINE, manual, with 20 cm dia. disk to take polishing cloths or abrasive paper. With fractional hp 1420 rev/min motor, giving disk speeds of 500, 750 and 1000 rev/min, mounted on a heavy metal box together with a splash guard and drip-feed reservoir. The rate of feed and the height and position of the reservoir can be varied as required. For 220/240V a.c. single phase supplies ... ... Each **£144·00** *mxN*


PS-810

POLISHING MATERIALS

PS-820

CARBORUNDUM POWDER, 400 mesh, for coarse polishing of metallurgical specimens. In pack containing approx. 500 g ... ... Pack **£0·90** *cx*

PS-822

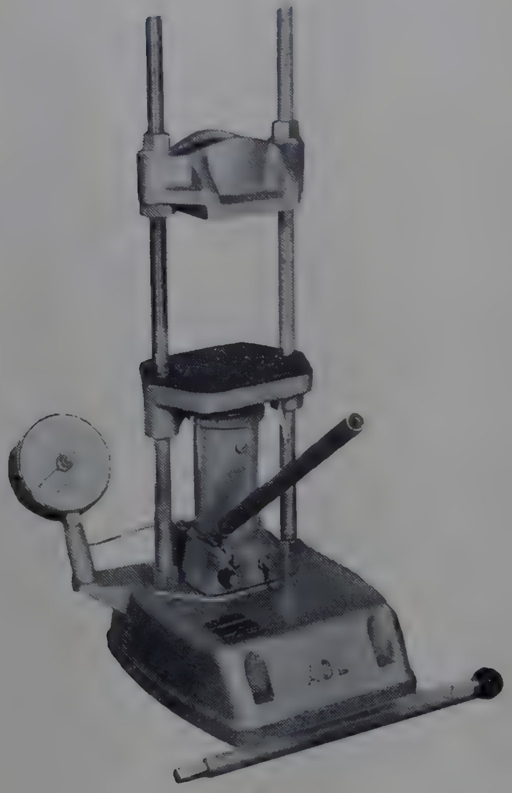
ALUMINA POWDER, for fine polishing of metallurgical specimens. In bottle containing approx. 25 g.

Grade	2/20	1/30	Gamma	
Particle size, average	2	1	under 1 μm	
5 bottles	**£7·00**	**10·60**	**13·40**	*mx*
Bottle	**£1·50**	**2·30**	**3·10**	

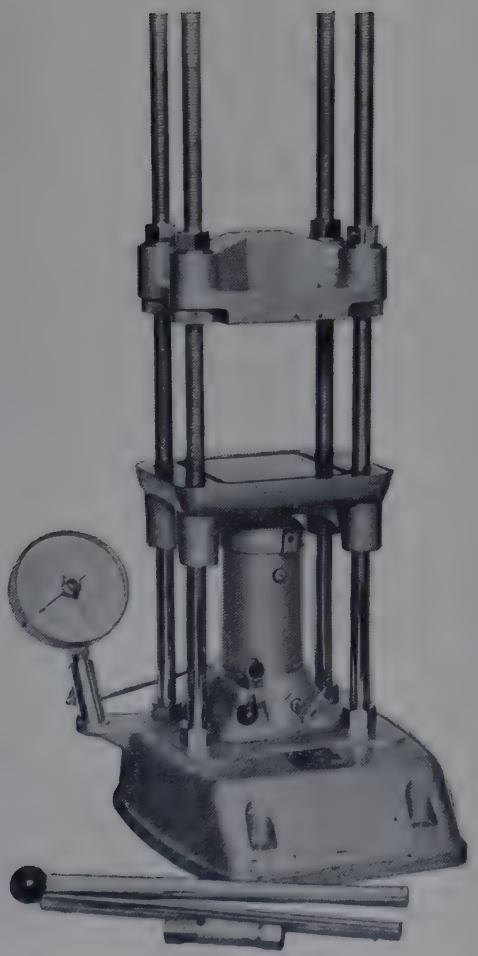
POLLUTION MEASUREMENTS

Apparatus, manufactured by *Gallenkamp*, *Mettler* and *Olympus*, which may be of interest to those concerned with pollution measurements is listed below. Full details and prices will be found under the entries in List No. sequence.

BA-500 et seq.	Balances, *Mettler*, including micro, analytical and top loading models.
CF-405 et seq.	Centrifuges, *Gallenkamp*.
CX-300	Bacterial Colony Counter, *Gallenkamp*.
CX-650	Controlled Environment Culture Apparatus, *Gallenkamp*, for studies of the microbiological treatment of sewage and effluent.
FD-300 et seq.	Membrane Filter Holders, *Gallenkamp*, for bacteriological filtration.
GC-020 et seq.	Orsat Gas Analysers, *Gallenkamp*, for CO, CO_2 and O_2 determinations.
GC-220	Sulphur Oxides Analyser, *Gallenkamp*, for SO_2 and SO_3 determinations.
GC-400 et seq.	Lloyd Gas Analysers, *Gallenkamp*, for precise determinations of CO, CO_2, O_2 and CH_4.
GF-470	Dust Estimation Apparatus, (AG).
GF-520 et seq.	Gas Washbottles, (AG), Drechsel pattern and with sintered glass distribution tubes.
IH-100	Fan Convection Incubators, *Gallenkamp*.
IH-275 et seq.	Cooled Incubators, *Gallenkamp*, including models for BOD testing and membrane filtration test for examination of water supplies.
IH-350 et seq.	Shaking Reaction and Orbital Incubators, *Gallenkamp*.
LH-530	Ultraviolet Lamp, *Gallenkamp*, for examination.
ML-100 et seq.	Microscopes, *Olympus*, including research inverted and stereoscopic models.
OV-010 et seq.	Drying Ovens, *Gallenkamp*.
PC-650	Sedimentation Balance, *Gallenkamp*, for particle size determinations.
SD-110 et seq.	Flask Shakers, *Gallenkamp*, for dispersing and extracting applications.
WF-360 et seq.	Thermostatic Water Baths, *Gallenkamp*.
WP-820	Imhoff Cone, (AG), for determination of solids in sewage.



PU-020



PU-025

HYDRAULIC PRESSES

Applications include:—

Crushing, breaking, extrusion, compression, flow and shearing tests. Extraction of liquids from plants, seeds and animal tissues.

The robust steel press is self-contained with hand pump and oil storage for the built-in ram and head adjustable for height.

A two-part handle 75 cm long is fitted, the short handle being used for rapidly closing the press. By adding the extension, the force can be slowly increased by making short pumping strokes.

The inclined pressure gauge has direct reading scales for total load, a maximum pressure indicator and a zero reset device.

The rising platen of the two column model PU-020 has a drainage groove and a delivery pipe for expressed liquids. With four column model PU-025 the lower platen can be put in contact with the press head enabling work on thin laminated materials to be carried out.

Technical data

Total load	10,000 kg (10 tons)
Size of platens	15 × 18 cm
Max. separation of platens	40 cm
Hydraulic lift	15 cm
Gauge scales	0 to 10,000 kg; 0 to 22,000 lb
Overall dimensions	95 × 45 × 50 cm
Weight, net	85 kg

PU-020

PRESS, hydraulic, Model A1, as specification, with two columns ... ... Each **£187·00** *fxN*

PU-025

PRESS, hydraulic, Model A14, as specification, with four columns for more accurate alignment of the platens. Each **£204·00** *fxN*

ACCESSORY EQUIPMENT

FOR PLASTICS, RUBBER AND HOT PRESSING

For plastics moulding, laminated board production, test cures of rubber mixes, and similar applications at elevated temperatures, the presses can be fitted with hotplates PU-055.

PU-055

HOTPLATES, electrically heated, 15 × 15 cm, temperature controlled up to 200°C by an external controller which can be mounted on the press. With thermometer pocket in each plate. For 220/240V a.c. single phase supplies ... ... Set of two **£100·00** *fxN*

REPLACEMENT PART

PU-056 **Heating elements** ... ... Set **£7·25** *fxN*

ACCESSORY

PU-076 **Thermometer,** with 7·5 cm scale in brass case, angle type, 0 to 200°C ... ... Each **£5·50** *fxN*

FOR SEPARATION OF LIQUIDS FROM SOLIDS

PU-080

PERFORATED CAGE, for use with **fibrous and hard materials,** capacity 1150 ml. With drainage channels directing the liquid to a groove in the rising table, plunger, ejector, three perforated plates and three felt pads ... ... Set **£95·00** *fxN*

PU-085

PLATE AND CLOTH, for use with **pulpy materials,** comprising six drainage plates, twelve filter cloths and one 12·5 cm former used to make square cakes of material. Set **£16·50** *fxN*

METALLURGICAL MOUNTING PRESS

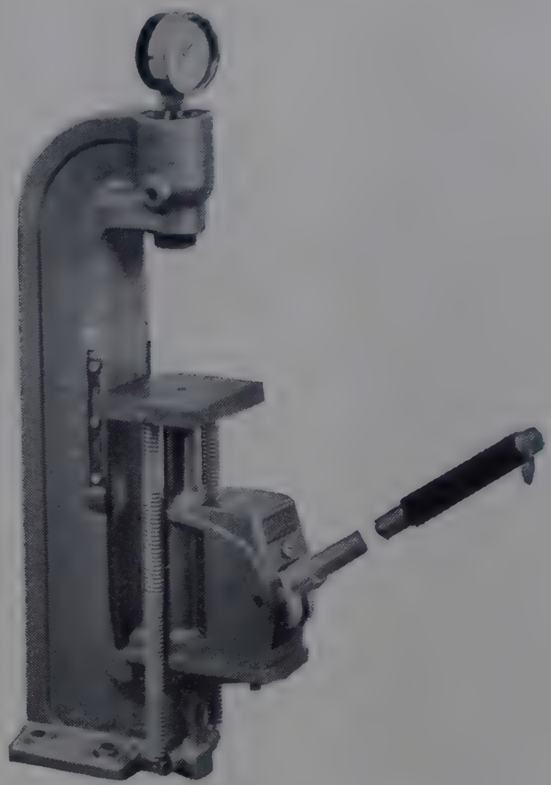
A self contained hydraulic press for mounting metallurgical specimens in plastics for examination.

Technical data

Total load	5,000 kg (5 tons)
Size of platens	15 × 18 cm
Hydraulic lift	15 cm
Gauge scales	0 to 5,000 kg; 0 to 11,000 lb
Overall dimensions	85 × 45 × 45 cm
Weight, net	70 kg

PU-130

METALLURGICAL MOUNTING PRESS, as specification. Comprising two columns with rising bottom platen, fixed head, inclined dual scaled gauge. With insulating plates, two-part handle and thermometer pocket. Suitable for producing 1 in (25 mm) and 1¼ in (32 mm) mounts ... ... Each **£150·00** *fx*



PU-130

MOUNTING ACCESSORIES

Suitable for pressures up to 30 kgf/cm² (2tf/in²).

PU-134 **Mould outfits,** comprising a steel cylinder, base and plunger drilled for thermometer.

For moulds	1	1¼ in dia.	
Each	**£19·50**	**19·50**	*fx*

PU-136 **Mould heaters, split type,** with aluminium head, cartridge elements, plated tongs and ebonite handles. For 200/250V a.c. single phase supplies.

For moulds	1	1¼ in	
Each	**£62·00**	**67·00**	*fx*

PU-138 **Mould coolers, split type,** with aluminium head, plated tongs and ebonite handles.

For moulds	1	1¼ in	
Each	**£36·50**	**40·00**	*fxN*

EC-810	**Energy regulator,** for heat control of PU-136	For prices see entries in List No. sequence.
TJ-050	**Thermometer,** mercury-in-glass, 0–200°C	

MOUNTING MEDIA

PU-145

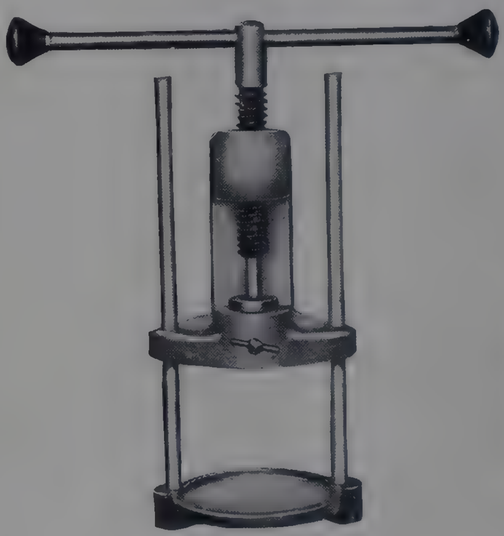
MOUNTING MEDIUM, thermosetting black bakelite, in pack containing 1 kg which is sufficient for about 70 mounts ... ... 5 packs **£3·80** Pack **£0·82** *cx*

PU-147

MOUNTING MEDIUM, thermoplastic acrylic transparent crystals. In pack containing 1 kg which is sufficient for about 70 mounts. 5 packs **£7·80** Pack **£1·70** *cx*

PU-155

MOUNTING MEDIUM, a cold setting acrylic resin for cold or hot mounting of metallographic specimens with or without pressure. Outfit comprises approximately 450 g of powder, 225 g of liquid and 55 g of hardener. Sufficient for about 100 mounts. Each **£2·25** *fx*



PU-180

PU-210

SODIUM WIRE PRESS

PU-180

PRESS, sodium wire, *Gallenkamp*, with hardened steel ram and mould 17 mm dia., complete with two moulds of 0·5 and 1·0 mm orifice diameter respectively. Overall dimensions 50 cm dia. × 50 cm high ... Each **£39·00** *bx*

REPLACEMENT PARTS

PU-183	**Steel mould,** with orifice 0·5 mm dia., to accept 17 mm ram... ... ... Each	**£4·70**	*bx*
PU-184	**Steel mould,** with orifice 1·0 mm dia., to accept 17 mm ram... ... ... Each	**£4·70**	*bx*

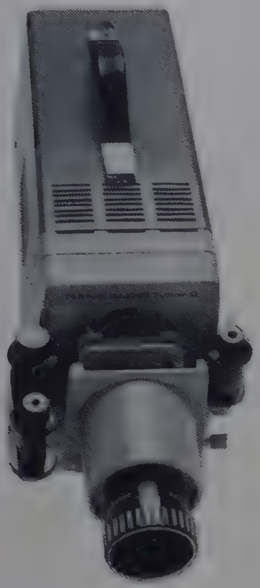
TABLET PRESS

PU-210

TABLET PRESS, *Gallenkamp*, for 2 mm and 5 mm dia. tablets, with hardened steel rams and dies. Overall dimensions 10 cm dia. × 20 cm high ... ... Each **£8·00** *bx*

PRESSES, Botanical see BIOLOGICAL SCIENCES
PRESSES, Cork see CORK ACCESSORIES

PROJECTORS



PV-430

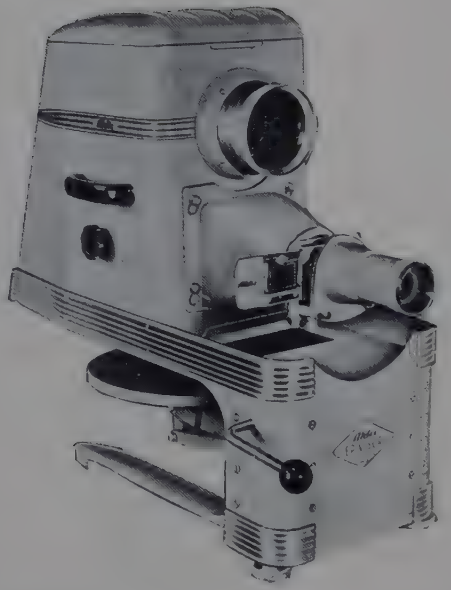
SLIDE AND FILMSTRIP PROJECTOR

PV-430

SLIDE AND FILMSTRIP PROJECTOR, *Rank Aldis* **Tutor 2,** for 35 mm slides and strips. Fitted with 24V 250W quartz halogen lamp cooled by motor driven fan. Includes carrying handle and mains voltage output socket. Complete with 10 cm lens, indexing film winder and slide carrier. For 110 to 250V a.c. single phase supplies.
Each **£51·89** *fxN*

ACCESSORIES

PV-434	**Fitted carrying case**	Each	**£5·25** *fxN*
PV-436	**Lamp, replacement**	Each	**£2·07** *fxN*



PV-492

EPIVISOR EPIDIASCOPE

The *Epivisor* is suitable for visual aid work in education and industrial training. Fitted with a 1000W lamp and cooling fan, it projects film strips, slides, drawings, photographs, maps, charts and book pages, an area up to 12·5×12·5 cm being projected. An important feature of the *Epivisor* is the facility for instantly removing the entire upper section in order to place it on large flat subjects such as maps or blueprints. The projector then slides smoothly across the surface on polished feet, projecting that portion of the subject which is beneath the viewing aperture.

PV-492

EPIDIASCOPE, *Aldis Epivisor,* as specification, with 35 cm *f*4 lens for episcope projection and 10 cm *f*2·8 lens for 2×2 in slides, complete with lamp for 240V a.c. single phase supplies ... ... Each **£132·58** *fxN*

REPLACEMENT PART

PV-496	**Projection lamp,** 1000W	Each	**£5·00***mxN*

When ordering please state voltage and frequency of supply.

PV-530

PV-530

OVERHEAD PROJECTOR, *Bell & Howell,* projects well defined pictures in daylight on to any suitable screen placed from approximately 150 cm to 500 cm away. Includes a three element lens, hard coated long-life reflector, 650W tungsten halogen lamp, cooling fan and 25×25 cm aperture. The picture can be elevated 20° up or 7° down from horizontal using the reflector and the projector body can also be tilted 5° giving a total upwards tilt of 25°. The lens head swivels 360°. Complete with lamp, roll feed attachment and approximately 1·5 m roll.

Overall dimensions	34×34×25 cm high
Weight, net	8 kg

For 220/240V 50 Hz single phase supplies.

Each **£120·00** *fxN*

PYROMETER INDICATORS

MAXIMUM TEMPERATURE 1200°C

PX-040

PYROMETER, flush mounting, 7 cm rectangular scale, range **0–1200°C. Requires but does not include a chromel-alumel thermocouple** ... Each **£10·00** *mx*

ACCESSORY

EE-645 **Bench stand.** For details and price see entry in List No. sequence.

PX-045

PYROMETER, bracket mounting, 10 cm scale, range **0–1200°C.** With automatic cold junction compensation. **Requires but does not include a chromel-alumel thermocouple** ... ... Each **£29·00** *mx*

PX-050

PYROMETER, portable, 20 cm scale, range **0–1200°C.** With manual cold junction compensation. **Requires but does not include a chromel-alumel thermocouple.** Each **£48·00** *mx*

ACCESSORIES for PX-040, PX-045 and PX-050

PX-052 **Thermocouple, chromel-alumel, furnace mounting pattern,** for 23 cm immersion. With mounting flange, 10 mm outside diameter porcelain sheath and 185 cm of flexible compensating cable with spade ends. Each **£5·40** *mx*

PX-054 **Thermocouple, chromel-alumel, blade pattern,** with 46 cm handle and 185 cm of flexible compensating cable with spade ends ... ... Each **£8·60** *mx*

PX-055 **Thermocouple, chromel-alumel, needle pattern,** with pistol grip and 185 cm of flexible compensating cable with spade ends ... ... Each **£11·40** *mx*

PX-057 **Rotary switch, 3-way,** wall mounting, double pole with self cleaning contacts, mounted in dustproof case. Each **£16·50** *mx*

PX-059 **Compensating cable,** flexible, for chromel-alumel thermocouples. Colour coded to BS 1843. Metre **£0·80** *mx*

MAXIMUM TEMPERATURE 1600°C

PX-075

PYROMETER, flush mounting, 7 cm rectangular scale, range **0–1600°C. Requires but does not include a platinum–13% rhodium platinum thermocouple.** Each **£10·00** *mx*

ACCESSORY

EE-645 **Bench stand.** For details and price see entry in List No. sequence.

PX-085

PYROMETER, bracket mounting, 10 cm scale, range **0–1600°C. Requires but does not include a platinum–13% rhodium platinum thermocouple.** Each **£28·00** *mx*

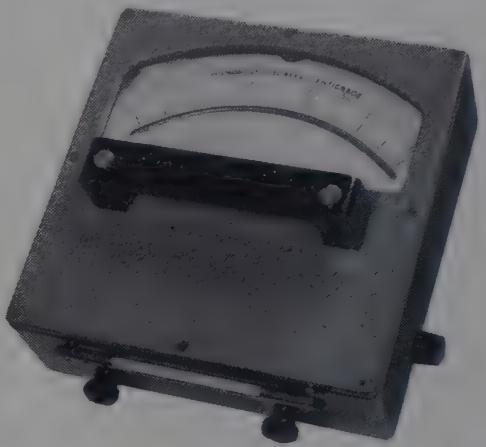
PX-095

PYROMETER, portable, 20 cm scale, range **0–1600°C. Requires but does not include a platinum–13% rhodium platinum thermocouple** ... Each **£48·00** *mx*

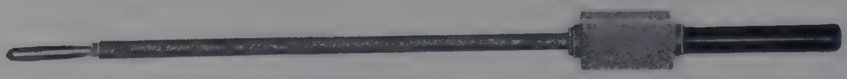
0
200
400
600
800
1000
1200
°C
Gallenkamp

PX-040
PX-075 is similar

PX-045
PX-085



PX-050
PX-095



PX-054

PX-055

ACCESSORIES for PX-075, PX-085 and PX-095

PX-096 **Thermocouple, platinum–13% rhodium platinum, furnace mounting pattern,** for 23 cm immersion. With mounting flange, aluminous porcelain sheath 10 mm outside diameter and 185 cm of flexible compensating cable with spade ends ... ... Each **£21·50** *mx*

PX-097 **Thermocouple, platinum–13% rhodium platinum, portable pattern,** 30 cm long, with aluminous porcelain sheath 10 mm outside diameter, ebonite handle and 185 cm of flexible compensating cable with spade ends. Each **£22·50** *mx*

PX-099 **Compensating cable,** flexible, for platinum–13% rhodium platinum thermocouples. Colour coded to BS 1843 ... ... Metre **£0·55** *mx*

PX-057 **Rotary switch,** 3-way. For details and price see entry in List No. sequence.

PX-360

COLD JUNCTION

PX-360

COLD JUNCTION, automatic, electrically heated, operates at a constant preset temperature in the range 42 to 48°C with a temperature fluctuation less than 0·2degC independent of normal voltage and ambient temperature changes. Stabilisation takes approximately 45 min. The cylindrical aluminium body is wound with a heater and has a 19 mm hole drilled through its centre to accommodate thermocouple cold junctions. A plastics jacket encloses the drilled body and houses the controls. Overall dimensions 22 × 8·5 cm dia. For 200/250V a.c. single phase supplies ... ... Each **£15·75** *fx*

PX-375

THERMOCOUPLE TEST SET

Suitable for:

(a) Checking and calibration of thermocouples by comparison with a standard thermocouple.

(b) Measurement of thermocouple, lead resistance, etc. (the reversing switch enables correction to be made for any inherent e.m.f. in the circuit and avoids the need for reversing leads.)

(c) Calibration of indicators, recorders and controllers under correct conditions of external circuit resistance.

SPECIFICATION

Potentiometer ranges	0–20 mV and 1–100 mV
Potentiometer accuracy	about ±0·1%
Bridge accuracy	about ±0·1%
Potential source ranges	20 mV, 50 mV and 100 mV

PX-375

THERMOCOUPLE TEST SET, *Pye*, as specification, comprises d.c. potentiometer, Wheatstone bridge, potential source with variable resistance load, taut suspension pointer galvanometer, two 1·5V batteries and instructions manual in carrying case. Each **£120·00** *fxN*

PX-391

DISAPPEARING FILAMENT OPTICAL PYROMETER

Comprises essentially a lamp in circuit with a galvanometer and rheostat. By adjusting the rheostat, the brightness of the lamp filament adjusted to match that of the hot body whose temperature is to be measured. The lamp is contained within a short telescope, on which the galvanometer is mounted with its scale facing the observer. The matching of the filament is obtained by viewing it against a background formed by the hot body and adjusting the rheostat until the tip of the filament cannot be distinguished from the background. The reading on the galvanometer scale, which is calibrated in degC, then indicates the temperature of the hot body.

PX-391

PYROMETER, DISAPPEARING FILAMENT, *Cambridge*, range 700 to 1400°C, battery operated. With carrying handle which contains two 1·5V dry cell batteries. Each **£71·35** *fxN*

PX-393

PYROMETER, as PX-391, but double range 700 to 1300°C and 1000 to 1800°C ... ... Each **£79·30** *fxN*

QUICKFIT AND CLEARFIT STANDARD JOINT APPARATUS

A summary of the contents of the section, which has a broadly alphabetical arrangement will be found below.

A guide to other *Quickfit* apparatus included in this catalogue appears at the foot of this page.

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DISTILLATION AND PREPARATION
Quickfit and *Clearfit* sets

GAS GENERATORS

JOINTS
Cone and socket, flat flange and ball and cup joints

PIPETTES
Automatic dispensers

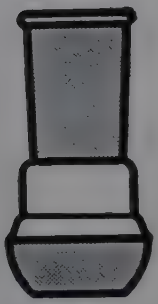
STOPCOCKS
Vacuum stopcocks

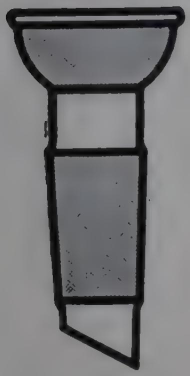
ADAPTERS

CONICAL-SPHERICAL ADAPTERS

These adapters used as a pair at a critical point provide a ready means of introducing flexibility into a conical jointed assembly.

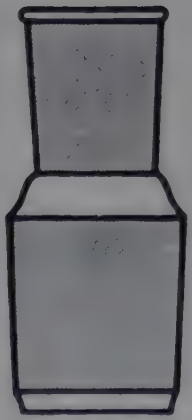
List No.	Socket	Ball	Clip Ref. JR-260	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-SB 2/29	19/26	S 29	JC 29	2	2·20	1·14
Q-SB 3/35	24/29	S 35	JC 35	2	2·50	1·30
	Cone	Cup				
Q-CC 2/29	19/26	S 29	JC 29	5	5·75	1·25
Q-CC 3/35	24/29	S 35	JC 35	5	5·75	1·25

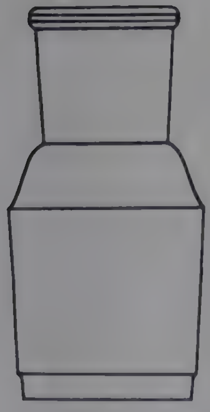

Q-SB 3/35


Q-CC 3/35

REDUCTION ADAPTERS

List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-DA 01	10/19	14/23	10	5·70	0·64
Q-DA 12	14/23	19/26	10	5·20	0·58
Q-DA 13	14/23	24/29	10	5·70	0·64
Q-DA 14	14/23	29/32	10	5·70	0·64
Q-DA 23	19/26	24/29	20	11·40	0·66
Q-DA 24	19/26	29/32	10	5·70	0·64
Q-DA 25	19/26	34/35	10	6·20	0·70
Q-DA 26	19/26	40/38	5	4·55	0·98
Q-DA 27	19/26	45/40	5	4·85	1·04
Q-DA 29	19/26	55/44	5	5·75	1·25
Q-DA 34	24/29	29/32	10	6·20	0·70
Q-DA 35	24/29	34/35	10	6·20	0·70
Q-DA 36	24/29	40/38	5	4·55	0·98
Q-DA 37	24/29	45/40	5	4·85	1·04
Q-DA 38	24/29	50/42	2	2·20	1·14
Q-DA 39	24/29	55/44	2	2·30	1·20
Q-DA 45	29/32	34/35	5	3·70	0·80
Q-DA 56	34/35	40/38	2	1·94	1·00
Q-DA 57	34/35	45/40	2	2·00	1·04
Q-DA 58	34/35	50/42	2	2·30	1·20
Q-DA 59	34/35	55/44	2	2·70	1·40
Clearfit					
Q-KDA 12	14/23	19/26	1	0·91	—
Q-KDA 13	14/23	24/29	1	0·97	—
Q-KDA 14	14/23	29/32	1	1·00	—
Q-KDA 23	19/26	24/29	1	1·00	—
Q-KDA 24	19/26	29/32	1	1·00	—
Q-KDA 34	24/29	29/32	1	1·10	—


Q-DA 24

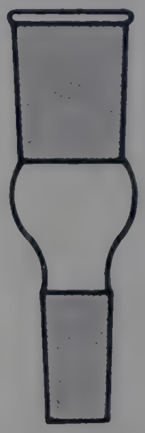

Q-KDA 24

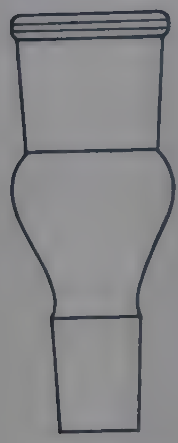
All items on this page are code *jx*.

ADAPTERS

EXPANSION ADAPTERS

List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-XA 10	14/23	10/19	5	4·30	0·92
Q-XA 21	19/26	14/23	10	6·20	0·70
Q-XA 31	24/29	14/23	10	6·90	0·78
Q-XA 32	24/29	19/26	10	6·90	0·78
Q-XA 41	29/32	14/23	5	4·55	0·98
Q-XA 42	29/32	19/26	5	4·30	0·92
Q-XA 43	29/32	24/29	10	8·00	0·90
Q-XA 52	34/35	19/26	5	4·85	1·04
Q-XA 53	34/35	24/29	5	4·55	0·98
Q-XA 54	34/35	29/32	2	1·82	0·94
Clearfit					
Q-KXA 21	19/26	14/23	1	0·91	—
Q-KXA 31	24/29	14/23	1	0·97	—
Q-KXA 32	24/29	19/26	1	0·97	—
Q-KXA 41	29/32	14/23	1	1·15	—
Q-KXA 42	29/32	19/26	1	1·15	—
Q-KXA 43	29/32	24/29	1	1·15	—

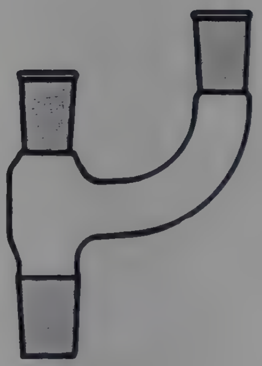

Q-XA 31

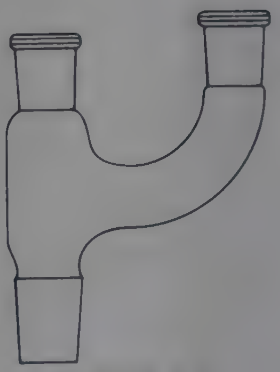

Q-KXA 42

MULTIPLE ADAPTERS

With two necks parallel

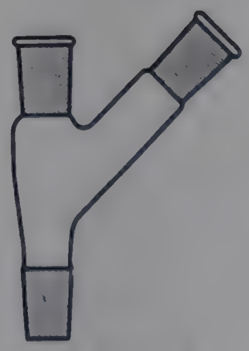
List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MA 1/00	10/19	10/13	1	1·45	—
Q-MA 1/11	14/23	14/23	5	7·25	1·55
Q-MA 1/2	19/26	19/26	5	7·25	1·55
Q-MA 1/3	19/26	24/29	5	7·25	1·55
Q-MA 1/33	24/29	24/29	2	3·80	1·95
Q-MA 1/5	19/26	34/35	1	1·50	—
Clearfit					
Q-KMA 1/2	19/26	19/26	1	1·70	—
Q-KMA 1/3	19/26	24/29	1	1·65	—
Q-KMA 1/33	24/29	24/29	1	2·20	—
Q-KMA 1/44	29/32	29/32	1	2·31	—

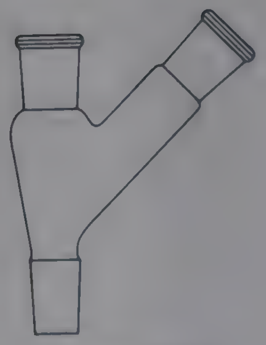

Q-MA 1/3


Q-KMA 1/3

With two necks at 45°

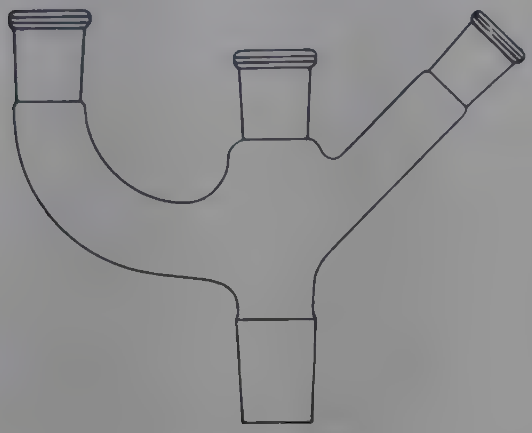
List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MA 2/2	19/26	19/26	2	3·00	1·55
Q-MA 2/3	19/26	24/29	2	3·00	1·55
Clearfit					
Q-KMA 2/33	24/29	24/29	1	1·95	—


Q-MA 2/2


Q-KMA 2/33

All items on this page are code *jx*.

ADAPTERS

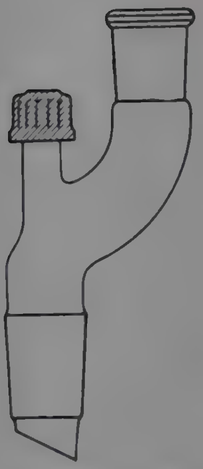


Q-KMA 4/23

MULTIPLE ADAPTERS

With three necks, two parallel, one at 45°

List No.	Sockets		Cone	Std. pack qty.	Std. pack	Each
	Parallel necks	Angled necks				
Quickfit					£	£
Q-MA 4/13	19/26	14/23	24/29	2	4·50	2·35
Q-MA 4/23	19/26	19/26	24/29	2	4·30	2·25
Q-MA 4/25	19/26	19/26	34/35	1	2·25	—
Clearfit						
Q-KMA 4/13	19/26	14/23	24/29	1	2·60	—
Q-KMA 4/23	19/26	19/26	24/29	1	2·50	—
Q-KMA 4/3	24/29	24/29	24/29	1	2·65	—
Q-KMA 4/1411	14/23	14/23	29/32	1	2·60	—

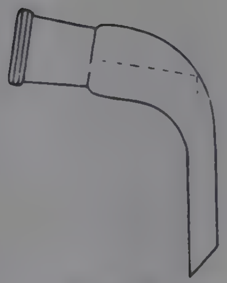


Q-KMA 6/33

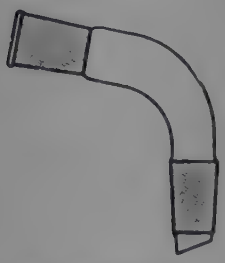
Swan neck adapters

With screw cap to accept thermometer or air leak tube

List No.	Socket	Cone	Thread	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-MA 6/11	14/23	14/23	13	2	2·80	1·45
Q-MA 6/22	19/26	19/26	13	2	2·80	1·45
Q-MA 6/23	19/26	24/29	13	1	1·40	—
Clearfit						
Q-KMA 6/33	24/29	24/29	13	1	1·75	—



Q-KRA 1/03

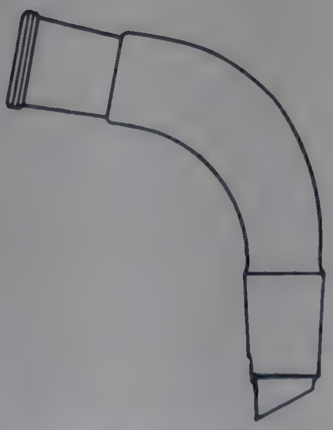


Q-RA 9/22

RECEIVER ADAPTERS

Plain bends, short

List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-RA 1/01	14/23	—	2	1·30	0·68
Q-RA 1/02	19/26	—	5	3·50	0·76
Q-RA 1/03	24/29	—	5	3·50	0·76
Q-RA 9/11	14/23	14/23	2	1·82	0·94
Q-RA 9/22	19/26	19/26	5	4·55	0·98
Q-RA 9/23	19/26	24/29	2	1·62	0·84
Q-RA 9/33	24/29	24/29	5	5·00	1·08
Q-RA 9/55	34/35	34/35	2	3·30	1·70
Clearfit					
Q-KRA 1/02	19/26	—	1	0·81	—
Q-KRA 1/03	24/29	—	1	0·81	—
Q-KRA 9/22	19/26	19/26	1	1·20	—
Q-KRA 9/33	24/29	24/29	1	1·35	—



Q-KRA 9/33

All items on this page are code *jx*.

ADAPTERS

RECEIVER ADAPTERS

Plain bends, long

List No.	Socket	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-RA 1/10	10/19	2	1·40	0·72
Q-RA 1/11	14/23	5	3·75	0·82
Q-RA 1/12	19/26	5	3·75	0·82
Q-RA 1/13	24/29	2	1·62	0·84
Clearfit				
Q-KRA 1/11	14/23	1	0·86	—
Q-KRA 1/12	19/26	1	0·86	—
Q-KRA 1/13	24/29	1	0·91	—
Q-KRA 1/14	29/32	1	1·00	—

Straight delivery adapters

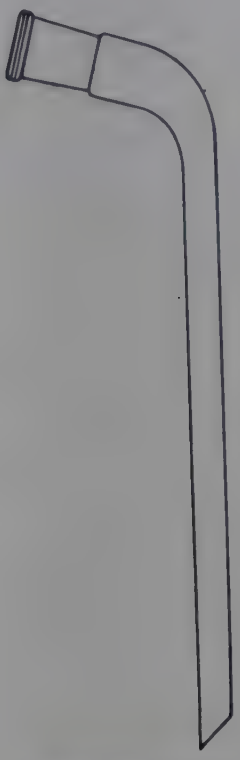
List No.	Socket	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-RA 1/21	14/23	1	0·65	—
Q-RA 1/22	19/26	5	3·25	0·70
Q-RA 1/23	24/29	2	1·30	0·68

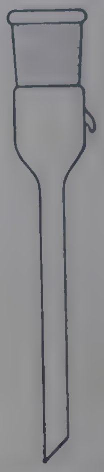
Bends with vent

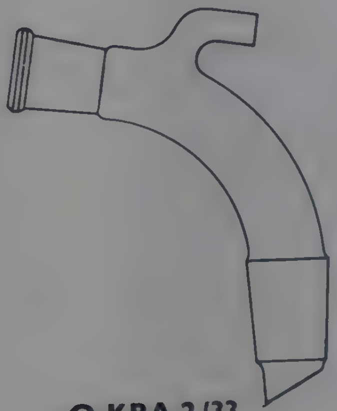
List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-RA 2/00	10/19	10/13	5	4·85	1·04
Q-RA 2/11	14/23	14/23	5	4·85	1·04
Q-RA 2/22	19/26	19/26	5	5·50	1·18
Q-RA 2/23	19/26	24/29	5	4·85	1·04
Q-RA 2/33	24/29	24/29	2	2·20	1·14
Clearfit					
Q-KRA 2/11	14/23	14/23	1	1·15	—
Q-KRA 2/22	19/26	19/26	1	1·30	—
Q-KRA 2/33	24/29	24/29	1	1·45	—

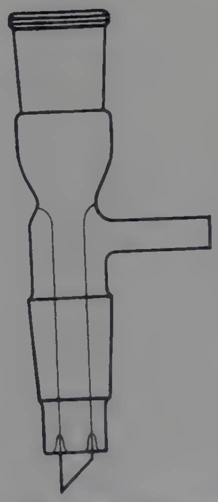
Vacuum type, straight

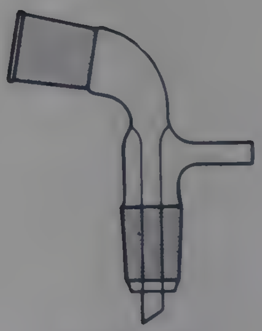
List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-RA 13/33	24/29	24/29	2	3·00	1·55
Clearfit					
Q-KRA 13/33	24/29	24/29	1	1·65	—


Q-KRA 1/12


Q-RA 1/22


Q-KRA 2/33


Q-KRA 13/33

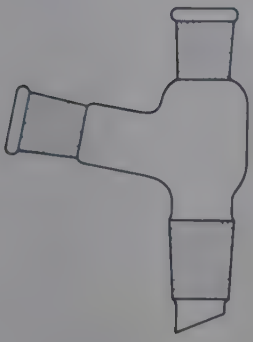

Q-RA 3/22

Vacuum type, bent

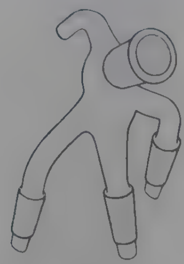
List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-RA 3/11	14/23	14/23	5	7·75	1·70
Q-RA 3/22	19/26	19/26	5	8·50	1·85
Q-RA 3/23	19/26	24/29	5	8·25	1·80
Q-RA 3/33	24/29	24/29	5	8·25	1·80
Clearfit					
Q-KRA 3/11	14/23	14/23	1	1·70	—
Q-KRA 3/22	19/26	19/26	1	1·85	—
Q-KRA 3/33	24/29	24/29	1	1·85	—
Q-KRA 3/44	29/32	29/32	1	2·05	—

All items on this page are code *jx*.

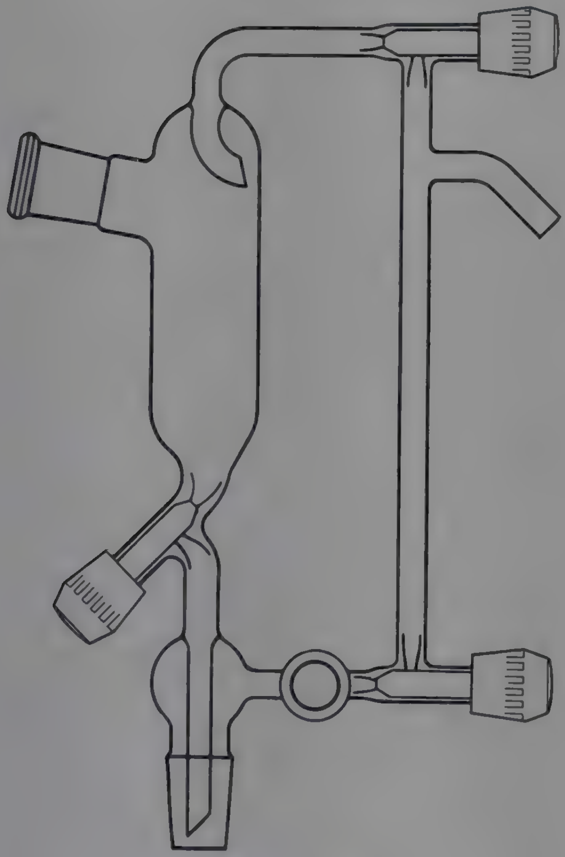
ADAPTERS



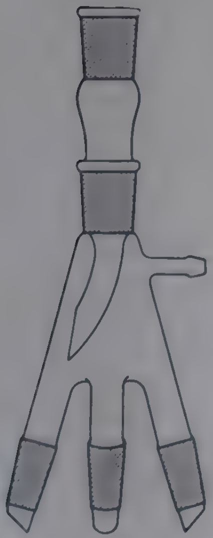
Q-RA 4/23



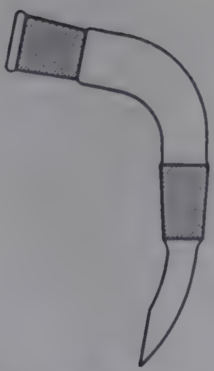
Q-RA 5/21



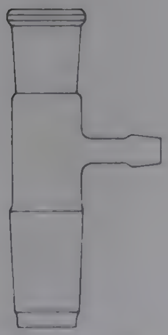
Q-KTA 6/11



Q-RA 11
Q-RA 11/2



Q-RA 12/2



Q-KMF 17/1
Q-KMF 18/2

RECEIVER ADAPTERS

Bends with socket connection

List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-RA 4/11	14/23	14/23	2	2·70	1·40
Q-RA 4/22	19/26	19/26	2	2·80	1·45
Q-RA 4/23	19/26	24/29	2	2·90	1·50

Bends with multiple connections (pig)

List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-RA 5/00	10/19	10/13	2	4·30	2·25
Q-RA 5/11	14/23	14/23	5	16·50	3·60
Q-RA 5/21	19/26	14/23	5	16·75	3·60

Perkin intermediate receiver

List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Clearfit/Rotaflo				£	£
Q-KTA 6/11	14/23	14/23	1	12·50	—

Adapters, socket to cone, with T-connection

List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MF 17/1	14/23	14/23	5	4·30	0·92
Q-MF 17/2	14/23	19/26	2	1·72	0·90
Q-MF 17/3	14/23	24/29	2	1·82	0·94
Q-MF 18/2	19/26	19/26	10	11·00	1·25
Q-MF 18/3	19/26	24/29	5	4·30	0·92
Q-MF 18/5	19/26	34/35	2	2·00	1·04
Q-MF 18/33	24/29	24/29	5	5·50	1·18
Clearfit					
Q-KMF 17/1	14/23	14/23	1	1·15	—
Q-KMF 18/2	19/26	19/26	1	1·25	—
Q-KMF 18/33	24/29	24/29	1	1·35	—

Vacuum type, with multiple connections

List No.	Description	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-RA 11	Vacuum receiver adapter, with 14/23 cones to take 4×100 ml receiver flasks	19/26	14/23	2	6·70	3·50
Q-RA 11/2	Adapter for vertical delivery	19/26	19/26	1	1·00	—
Q-RA 12/2	Adapter for sloping delivery	19/26	19/26	2	2·70	1·40

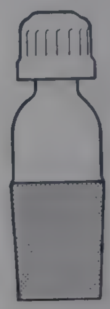
All items on this page are code *jx*.

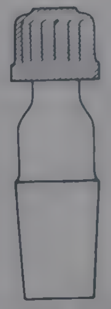
ADAPTERS

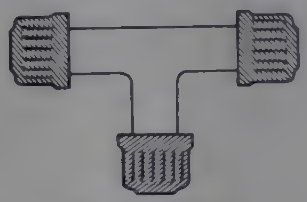
WITH SCREW THREADS TO BS 1918

Cone and screw cap adapters

List No.	Thread	Cone	Dia. through Screw Cap mm	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-ST 51/13	13	14/23	6 – 7	20	17·20	1·00
Q-ST 52/13	13	19/26	6 – 7	10	8·60	0·96
Q-ST 53/13	13	24/29	6 – 7	5	4·55	0·98
Q-ST 54/13	13	29/32	6 – 7	5	5·00	1·08
Q-ST 51/18	18	14/23	7 – 8·5	10	9·10	1·02
Q-ST 52/18	18	19/26	7 – 8·5	10	9·10	1·02
Q-ST 53/18	18	24/29	7 – 8·5	5	4·55	0·98
Q-ST 54/18	18	29/32	7 – 8·5	10	10·00	1·10
Q-ST 52/24	24	19/26	10·5–11·5	5	5·50	1·20
Q-ST 53/24	24	24/29	10·5–11·5	5	5·00	1·08
Q-ST 55/24	24	34/35	10·5–11·5	1	1·30	—
Q-ST 55/28	28	34/35	18 –19	1	1·25	—
Clearfit						
Q-KST 51/13	13	14/23	6 – 7	2	1·72	0·90
Q-KST 52/13	13	19/26	6 – 7	1	0·86	—
Q-KST 53/13	13	24/29	6 – 7	1	0·91	—
Q-KST 54/13	13	29/32	6 – 7	1	1·00	—
Q-KST 51/18	18	14/23	7 – 8·5	1	0·91	—
Q-KST 52/18	18	19/26	7 – 8·5	1	0·91	—
Q-KST 53/18	18	24/29	7 – 8·5	1	0·91	—
Q-KST 54/18	18	29/32	7 – 8·5	1	1·00	—
Q-KST 52/24	24	19/26	10 –11·5	1	1·10	—
Q-KST 53/24	24	24/29	10 –11·5	1	1·00	—
Q-KST 54/24	24	29/32	10 –11·5	1	1·10	—


Q-ST 53/13


Q-KST 53/13


Q-SQ 1/13

AG Regd. **ADAPTERS**

Suitable for fitting thermometers or gas entry tubes into standard joint sockets allowing adjustment of immersion depth. Cones 14/23 and 19/26.

For full details and prices see TJ-325 in List No. sequence.

REPLACEMENT PARTS for Screw Thread Connectors.

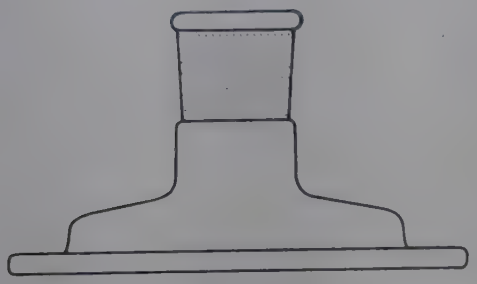
List No.	Thread	Std. pack qty.	Std. pack	Ten	Each
			£	£	£
Plastics Cap					
Q-QC 13/7	13	50	5·50	1·18	0·19
Q-QC 18/11	18	50	5·50	1·18	0·19
Q-QC 24/12	24	50	8·00	1·75	0·24
Rubber Ring					
Q-QR 13/6	13	100	4·00	0·45	0·13
Q-QR 18/7	18	50	3·50	0·76	0·15
Q-QR 24/11	24	20	2·40	1·25	0·19
Ptfe Washer					
Q-QW 13/6	13	100	4·00	0·45	0·13
Q-QW 18/7	18	100	5·00	0·55	0·13
Q-QW 24/11	24	20	1·60	0·84	0·16

Connectors, T-shape

List No.	Thread	Approx. length of limbs mm	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-SQ 1/13	13	35	2	2·62	1·35
Q-SQ 1/18	18	40	2	3·32	1·75

All items on this page are code *jx*.

ADAPTERS



Q-DA 5/75
Q-DA 5/100

FLAT FLANGE ADAPTERS

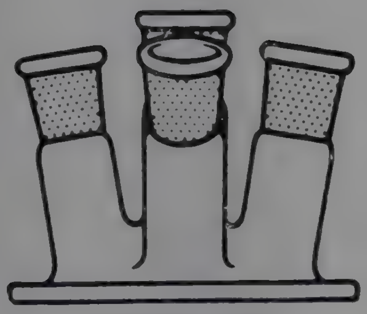
The flange sizes given below represent the internal diameters in mm within the flanges.

Reaction vessels for use with flat flange adapters are listed on page 581.

Flat flange clips see JR-260 listed on page 390.

Single socket/flat flange

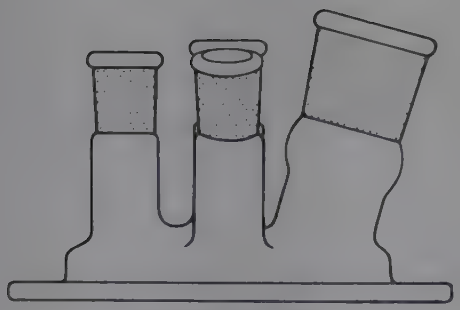
List No.	Flat flange mm	Centre Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-DA 5/75	75	34/35	2	6·20	3·20
Q-DA 5/100	100	34/35	2	6·20	3·20



Q-MAF 0/50
Q-MAF 1/75

Multi socket/flat flange

List No.	Flat flange mm	Centre Socket	Side Sockets	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-MAF 0/50	50	10/19	4×10/19	1	5·10	—
Q-MAF 1/75	75	19/26	3×19/26 1×14/23	5	26·25	5·70
Q-MAF 2/2	100	19/26	4×19/26	5	26·25	5·70
Q-MAF 2/32	100	19/26	2×19/26 1×24/29	5	23·50	5·10
Q-MAF 2/52	100	19/26	3×19/26 1×34/35	5	28·50	6·20
Q-MAF 3/52	100	24/29	3×19/26 1×34/35	5	29·75	6·40
Q-MAF 5/2	100	34/35	3×19/26	1	5·80	—

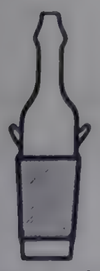


Q-MAF 2/52
Q-MAF 3/52

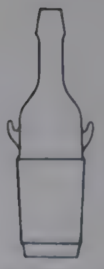
TUBING ADAPTERS

Cone to rubber tubing, straight connection

List No.	Cone	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-MF 10/1	14/23	10	6·50	0·72
Q-MF 10/2	19/26	10	7·00	0·78
Q-MF 10/3	24/29	10	8·10	0·90
Clearfit				
Q-KMF 10/1	14/23	1	0·70	—
Q-KMF 10/2	19/26	1	0·81	—
Q-KMF 10/3	24/29	1	0·91	—



Q-MF 10/2



Q-KMF 10/2

All items on this page are code *jx*.

ADAPTERS

TUBING ADAPTERS

Cone to rubber tubing, right angle connection

List No.	Cone	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-MF 10/1B	14/23	10	7·00	0·78
Q-MF 10/2B	19/26	10	8·10	0·90
Q-MF 10/3B	24/29	10	8·60	0·96
Q-MF 10/4B	29/32	5	4·55	0·98
Q-MF 10/5B	34/35	2	1·94	1·00
Clearfit				
Q-KMF 10/2B	19/26	1	0·86	—
Q-KMF 10/3B	24/29	1	0·91	—
Q-KMF 10/4B	29/32	1	0·97	—

Cone to rubber tubing, straight connection

List No.	Cone	Std. pack qty.	Std. pack	Each
Clearfit/Rotaflo			£	£
Q-KTA 11/1	14/23	1	2·90	—
Q-KTA 11/2	19/26	1	2·90	—
Q-KTA 11/3	24/29	1	2·90	—
Q-KTA 11/4	29/32	1	2·90	—

Cone with stem to rubber tubing, right angle connection

List No.	Socket	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-MF 15/1B	14/23	5	3·75	0·82
Q-MF 15/2B	19/26	5	4·30	0·92
Q-MF 15/3B	24/29	5	4·85	1·04

Socket to rubber tubing, straight connection

List No.	Cone	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-MF 13/2	19/26	5	4·05	0·88
Q-MF 13/3	24/29	5	4·05	0·88

STOPCOCK ADAPTERS

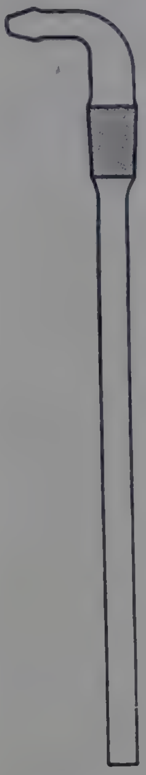
Cone to rubber tubing, with interchangeable stopcock, straight connection

List No.	Cone	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-MF 11/1	14/23	2	4·20	2·20
Q-MF 11/2	19/26	5	11·00	2·40
Q-MF 11/3	24/29	5	11·25	2·50

Cone to rubber tubing, with interchangeable stopcock, right angle connection

List No.	Cone	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-MF 11/1B	14/23	2	4·40	2·30
Q-MF 11/2B	19/26	5	11·25	2·45
Q-MF 11/3B	24/29	2	4·70	2·45
Q-MF 11/5B	34/35	2	5·00	2·60

Q-D 5/4 STOPCOCK KEYS, interchangeable. } For prices see page 580.
Q-D 5/4R PLASTICS RETAINING RINGS. }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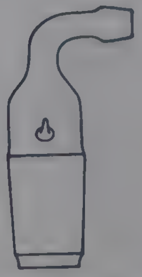
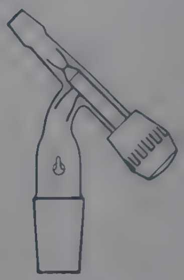
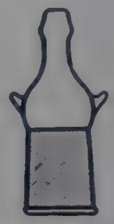
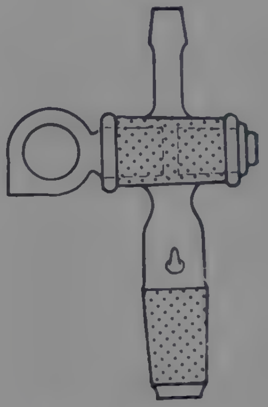
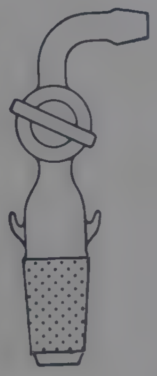
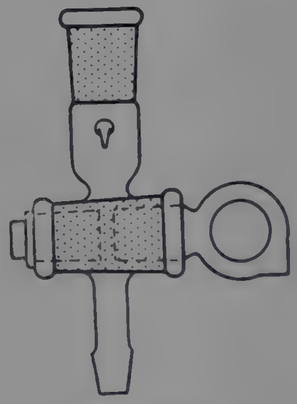

Q-KMF 10/3B

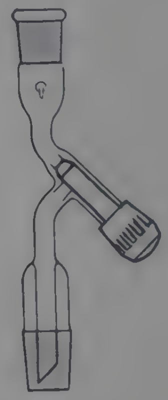

Q-KTA 11/3

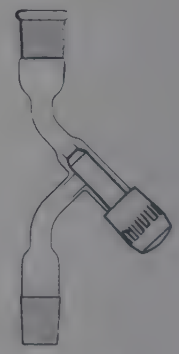

Q-MF 13/3


Q-MF 11/3


Q-MF 11/3B


Q-MF 14/2


Q-CR 3T/23


Q-EF 6T/33

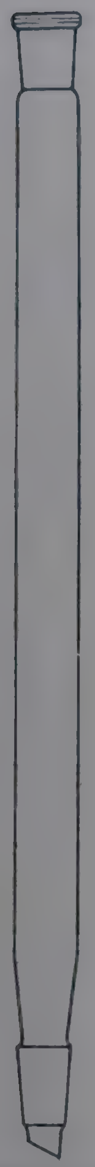
Socket to rubber tubing, with interchangeable stopcock

List No.	Socket	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-MF 14/1	14/23	2	4·40	2·30
Q-MF 14/2	19/26	2	4·50	2·35
Q-MF 14/2B	19/26	1	2·35	—
Q-MF 14/3	24/29	2	4·70	2·45

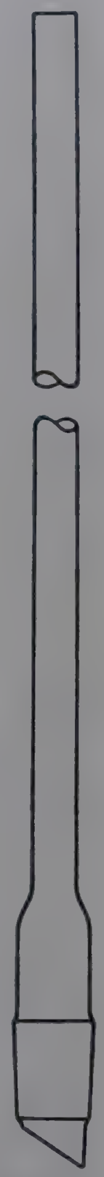
Vacuum stopcock

List No.	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit/Rotaflo				£	£
Q-CR 3T/23	19/26	24/29	1	5·10	—
Q-EF 6T/33	24/29	24/29	1	5·45	—
Q-EF 6T/55	34/35	34/35	1	6·15	—

All items on this page are code *jx*.



Q-KC 2/22



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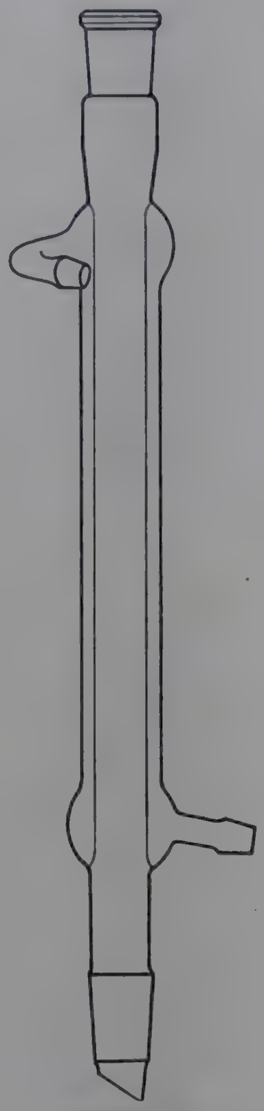
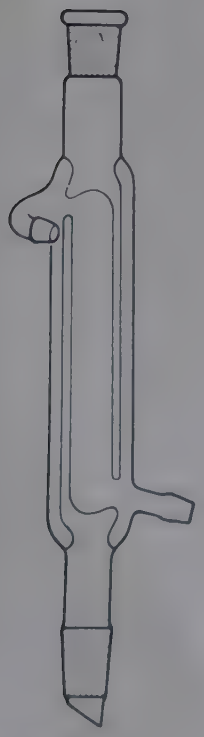
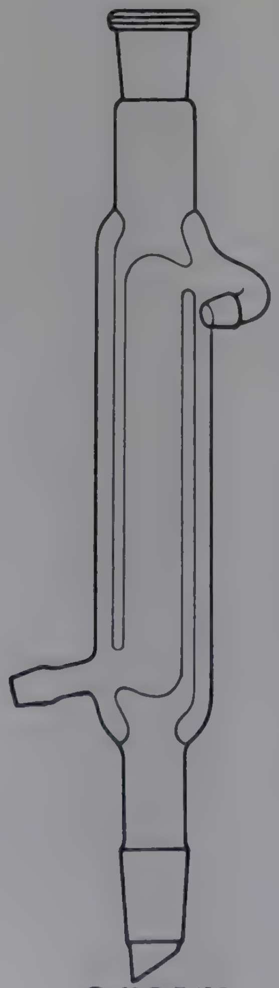


Q-KC 1/12



Q-C 5/12



Q-KC 5/23

CONDENSERS

AIR CONDENSERS

List No.	Effective length mm	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-C 2/00	100	10/19	10/13	2	1·40	0·72
Q-C 2/11	200	14/23	14/23	2	1·30	0·68
Q-C 2/12	150	19/26	19/26	2	1·50	0·78
Q-FC 7/23	300	24/29	24/29	2	1·82	0·94
Q-C 2/22	400	19/26	19/26	2	1·60	0·82
Q-FC 7/43	550	24/29	24/29	2	2·70	1·40
Q-FC 7/53	800	24/29	24/29	1	1·75	—
Clearfit						
Q-KC 2/11	200	14/23	14/23	1	1·00	—
Q-KC 2/12	150	19/26	19/26	1	1·10	—
Q-KC 2/22	400	19/26	19/26	1	1·15	—
Q-KCX 2/23	760	—	24/29	1	1·15	—

LIEBIG CONDENSERS

List No.	Effective length mm	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-C 1/00	60	10/19	10/13	5	6·25	1·40
Q-C 1/11	150	14/23	14/23	5	7·75	1·70
Q-C 1/12	200	19/26	19/26	5	8·00	1·75
Q-C 1/13	200	24/29	24/29	5	9·25	2·00
Q-C 1/22	400	19/26	19/26	5	8·75	1·95
Q-C 1/23	400	24/29	24/29	2	3·90	2·00
Q-C 1/55	500	34/35	34/35	1	7·25	—
Clearfit						
Q-KC 1/11	150	14/23	14/23	1	1·75	—
Q-KC 1/12	200	19/26	19/26	1	1·85	—
Q-KC 1/13	200	24/29	24/29	1	2·05	—
Q-KC 1/22	400	19/26	19/26	1	2·00	—
Q-KC 1/23	400	24/29	24/29	1	2·15	—
Q-KC 1/44/30	300	29/32	29/32	1	3·45	—

DAVIES CONDENSERS

List No.	Effective length mm	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-C 5/00	100	10/19	10/13	1	3·40	—
Q-C 5/12	150	19/26	19/26	1	2·95	—
Q-C 5/13	150	24/29	24/29	1	3·15	—
Q-C 5/22	200	19/26	19/26	1	3·00	—
Q-C 5/23	200	24/29	24/29	1	3·25	—
Q-CX 5/25	200	—	34/35	1	3·60	—
Clearfit						
Q-KC 5/12	150	19/26	19/26	1	3·25	—
Q-KC 5/13	160	24/29	24/29	1	3·40	—
Q-KC 5/22	200	19/26	19/26	1	3·35	—
Q-KC 5/23	200	24/29	24/29	1	3·50	—
Q-KC 5/24	200	29/32	29/32	1	3·70	—

All items on this page are code *jx*.

CONDENSERS

COIL OR GRAHAM CONDENSERS

List No.	Effective length mm	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-C 3/12	150	19/26	19/26	2	5·00	2·60
Q-C 3/13	150	24/29	24/29	2	5·20	2·70
Q-CX 3/05	150	—	34/35	1	2·60	—
Q-CX 3/06	200	—	40/38	1	3·40	—
Q-CX 3/07	200	—	45/40	1	3·85	—
Q-CX 3/08	200	—	50/42	1	3·90	—
Q-C 3/22	300	19/26	19/26	1	4·20	—
Q-C 3/23	300	24/29	24/29	1	4·30	—
Clearfit						
Q-KC 3/12	150	19/26	19/26	1	2·75	—
Q-KC 3/13	150	24/29	24/29	1	2·80	—
Q-KC 3/14	150	29/32	29/32	1	2·80	—
Q-KC 3/23	320	24/29	24/29	1	4·40	—

REVERSIBLE COIL CONDENSERS

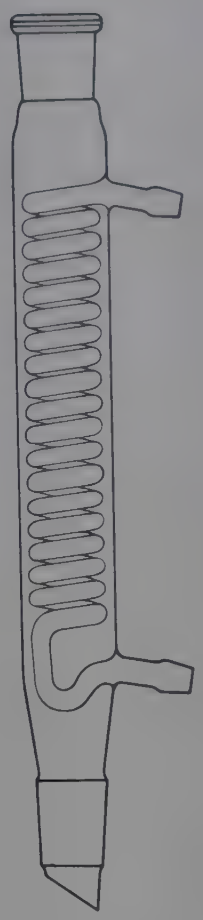
List No.	Effective length mm	Cones	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-CX 3/23	150	19/26 and 24/39	1	2·75	—
Q-CX 3/35	150	24/29 and 34/35	1	2·95	—

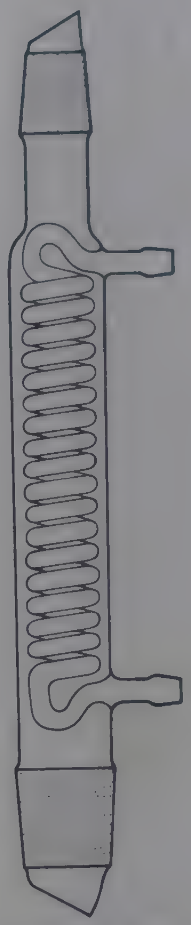
DOUBLE COIL CONDENSERS

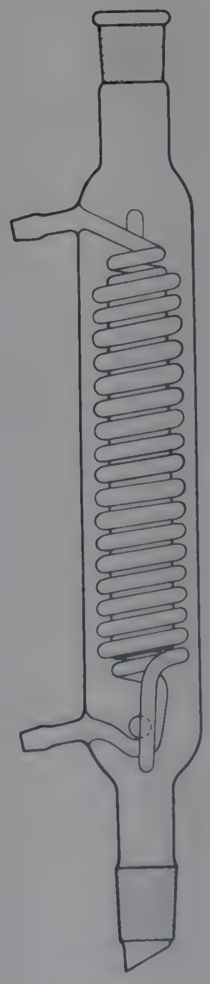
List No.	Effective length mm	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-C 4/12	200	19/26	19/26	1	7·20	—
Q-C 4/13	200	24/29	24/29	1	7·25	—
Q-C 13/55/2	380	34/35	34/35	1	15·90	—

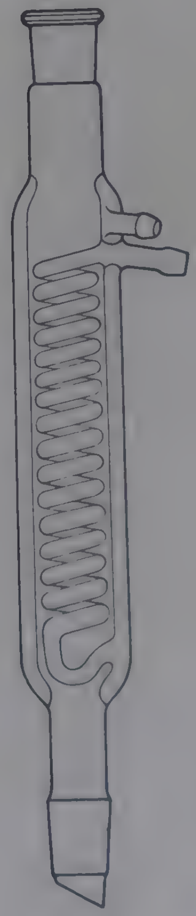
JACKETED COIL CONDENSERS

List No.	Effective length mm	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-CX 6/22	150	19/26	19/26	1	6·20	—
Q-CX 6/33	150	24/29	24/29	1	6·05	—
Q-CX 6/05	150	—	34/35	1	6·05	—
Clearfit						
Q-KCX 6/33	155	24/29	24/29	1	6·30	—


Q-KC 3/13


Q-CX 3/23


Q-C 4/12


Q-KCX 6/33

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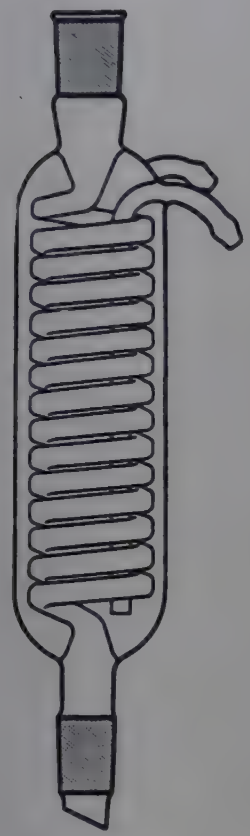
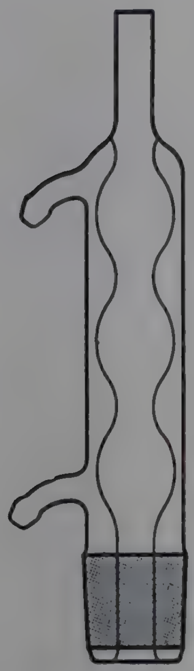
CONDENSERS



Q-C 6/13



Q-CX 7/06

INLAND REVENUE CONDENSERS

List No.	Effective length mm	Socket	Cone	Std. pack qty.	Std. pack
Quickfit					£
Q-C 6/12	200	19/26	19/26	1	6·20
Q-C 6/13	200	24/29	24/29	1	6·40

ALLIHN CONDENSERS

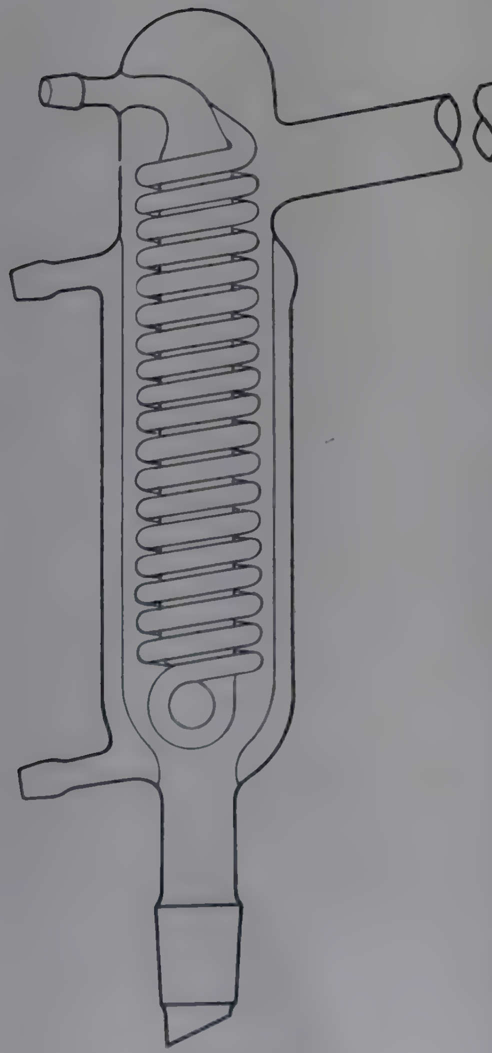
List No.	Effective length mm	Socket	Cone	Std. pack qty.	Std. pack
Quickfit					£
Q-CX 7/02	200	—	19/26	1	2·70
Q-CX 7/03	200	—	24/29	1	2·85
Q-CX 7/04	200	—	29/32	1	2·95
Q-CX 7/05	200	—	34/35	1	2·85
Q-CX 7/06	200	—	40/38	1	3·25
Q-CX 7/08	220	—	50/42	1	3·45
Clearfit					
Q-KCX 7/33	300	24/29	24/29	1	3·80

FRIEDRICHS CONDENSER

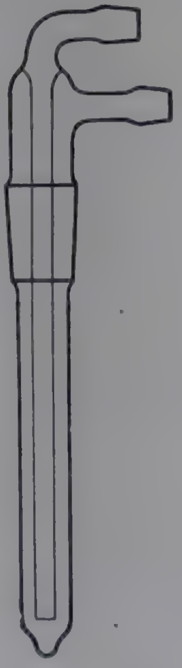
List No.	Effective length mm	Socket	Cone	Std. pack qty.	Std. pack
Quickfit					£
Q-C10/22	100	19/16	19/16	1	4·40

ETHER CONDENSER

List No.	Effective length mm	Socket	Cone	Std. pack qty.	Std. pack
Clearfit					£
Q-KC 11/33	180	24/29	24/29	1	12·00



Q-KC 11/33



Q-KFC 14/00

COLD FINGER CONDENSER

List No.	Effective length mm	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-FC 14/00	100	12	19/26	5	7·50	1·65
Clearfit						
Q-KFC 14/00	100	12	19/26	1	1·65	—

Ⓐ Standard joint condensers see CONDENSERS.

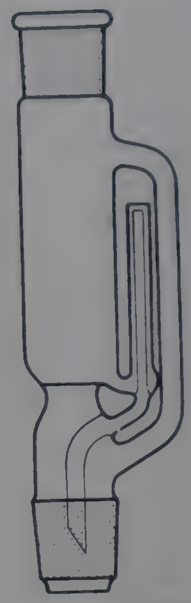
All items on this page are code *jx*.

EXTRACTORS

SOXHLET EXTRACTORS, to BS 2071.

List No.	Nominal capacity ml	Socket or Flange	Cone	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-EX 5/21	6	19/26	14/23	1	2·50	—
Q-EX 5/32	20	24/29	19/26	1	2·70	—
Q-EX 5/43	40	29/32	24/29	1	2·85	—
Q-EX 5/53	60	34/25	24/29	2	6·20	3·20
Q-EX 5/55	60	34/35	34/35	2	6·50	3·40
Q-EX 5/55/100	100	34/35	34/35	2	6·80	3·50
Q-EX 5/63	100	40/38	24/29	2	6·60	3·40
Q-EX 5/55/200	200	34/35	34/35	1	3·90	—
Q-EX 5/83	200	50/42	24/29	1	4·05	—
Q-EX 5/75 *	600	75 mm	34/35	1	11·95	—
Q-EX 5/105 *	2000	100 mm	34/35	1	18·35	—

* Extractors Q-EX 5/75 and Q-EX 5/105 are designed to accommodate large samples up to 75 mm and 100 mm diameter (e.g. wool). They utilise 75 mm and 100 mm flat flange joints together with 34/35 socket adapters, as below. Stainless steel clips are available for the flat flanges.



Q-EX 5/55

List No.	Description	Socket	Flange	
Quickfit				
Q-DA 5/75	Adapter to fit Q-EX 5/75	34/35	75 mm	For prices see entries on page 562
Q-DA 5/100	Adapter to fit Q-EX 5/105	34/35	100 mm	
JR-260	Clip JC 75F to fit Q-EX 5/75	For prices see entries in List No. sequence		
JR-260	Clip JC 100F to fit Q-EX 5/105			

Gallenkamp **SOXHLET WATER BATHS**
see EV-100

Ⓐ **SOXHLET EXTRACTORS**
see EV-280 and EV-285

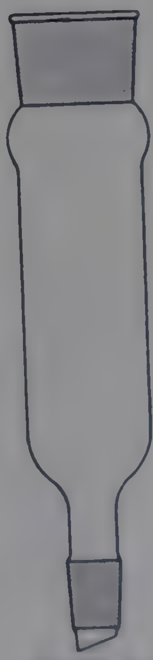
For details and prices see entries in List No. sequence.

JACKETED SOXHLET EXTRACTORS, for use with siphon liner or as plain tube with spiral support.

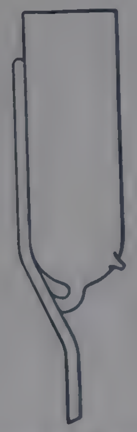
List No.	Description	Nominal capacity ml	Socket	Cone	Std. pack qty.	Std. pack
Quickfit						£
Q-EX 7/10	Liner	20	—	—	1	1·25
Q-EX 7/13	Body	—	34/35	24/29	1	1·25
Q-EX 7/15	Body	—	34/35	34/35	1	1·35
Q-EX 7/20	Liner	50	—	—	1	1·35
Q-EX 7/23	Body	—	45/40	24/29	1	1·85
Q-EX 7/30	Liner	100	—	—	1	1·45
Q-EX 7/33	Body	—	55/44	24/29	1	2·20

SPIRAL SUPPORTS, for use in extractor tubes and fractionating columns.

List No.	Diameter mm	To fit	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-EX 13/12	16	Q-FC 1	10	1·70	0·24
Q-EX 13/23	21	Q-FC 7	10	1·70	0·24
Q-EX 13/25	29	Q-FC 6 and 8	5	1·20	0·30
Q-EX 13/26	35	Q-EX 7/13 and 7/15 Q-EX 7/23 and 7/33	5	1·20	0·30



Q-EX 7/33



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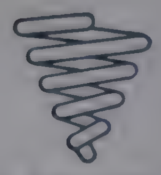

Q-EX 13/23

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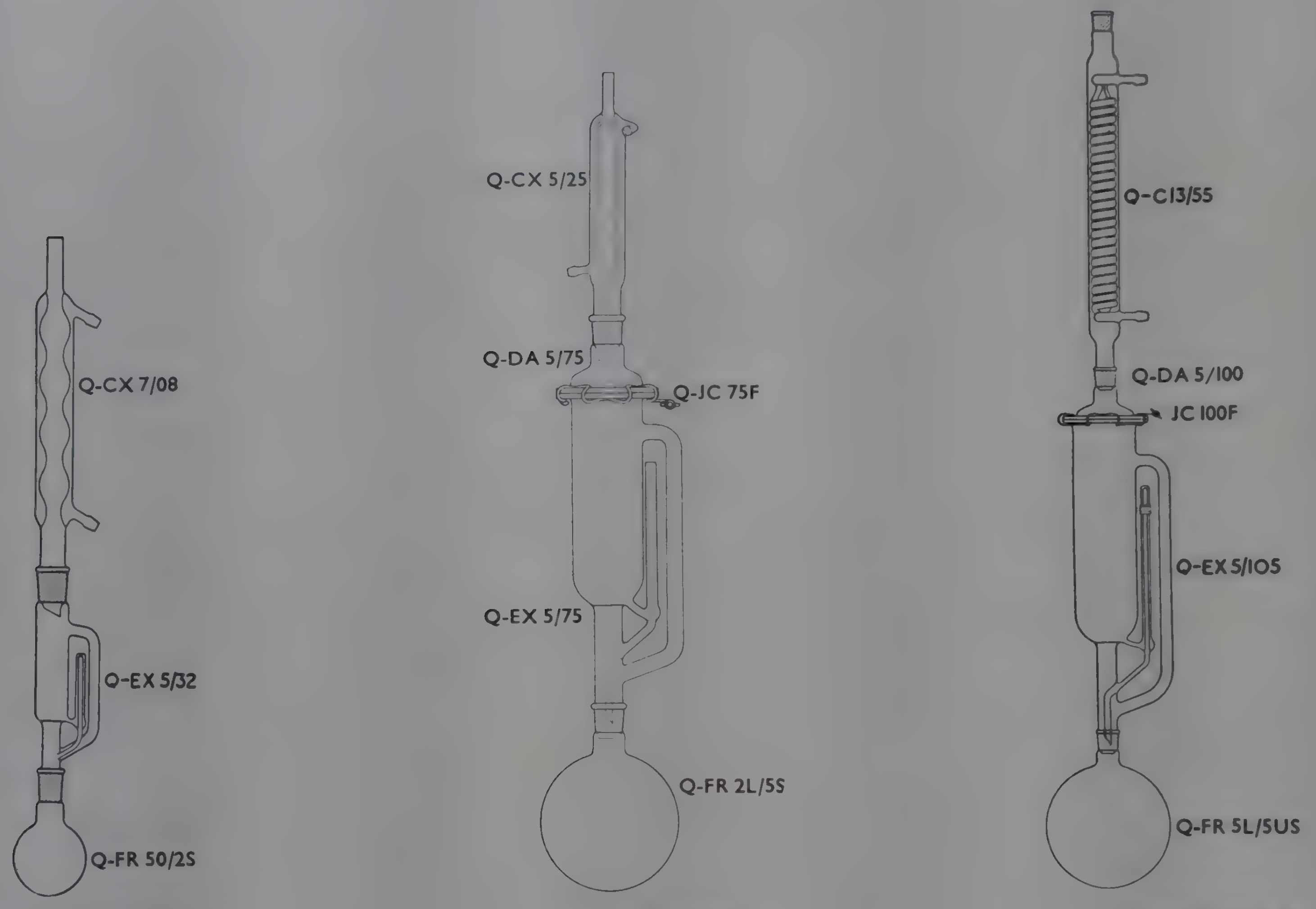
EXTRACTORS


Q-CX 7/08
Q-EX 5/32
Q-FR 50/2S
Q-CX 5/25
Q-DA 5/75
Q-JC 75F
Q-EX 5/75
Q-FR 2L/5S
Q-C13/55
Q-DA 5/100
JC 100F
Q-EX 5/105
Q-FR 5L/5US

Q-25 RASX **Q-600 RDSX** **Q-2L RCSX**

Specimen assemblies of extraction apparatus

SOXHLET LIQUID/SOLID EXTRACTION ASSEMBLIES

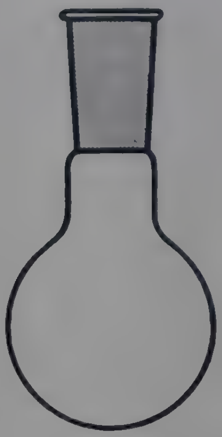
Assembly List No.	COMPONENTS							Suitable thimble size mm	Std. pack qty.	Std. pack
	EXTRACTOR BODY		FLASK		CONDENSER		ADAPTER			
	Capacity ml	List No.	Capacity ml	List No.	Type	List No.	List No.			
Quickfit										£
Q-4 PDSX	6	Q-EX 5/21	50	Q-FP 50/1	Davies	Q-C 5/12	—	10 × 50	1	**6·10**
Q-25 RASX	20	Q-EX 5/32	50	Q-FR 50/2S	Allihn	Q-CX 7/03	—	18 × 55	1	**6·15**
Q-40 RASX	40	Q-EX 5/43	100	Q-FR 100/3S	,,	Q-CX 7/04	—	22 × 80	1	**6·45**
Q-60 RASX	60	Q-EX 5/53	150	Q-FR 150/3S	,,	Q-CX 7/05	—	28 × 80	1	**6·55**
Q-100 RASX	100	Q-EX 5/63	250	Q-FR 250/3S	,,	Q-CX 7/06	—	33 × 100	1	**7·20**
Q-200 RASX	200	Q-EX 5/83	500	Q-FR 500/3S	,,	Q-CX 7/08	—	41 × 130	1	**8·30**
Q-600 RDSX	600	Q-EX 5/75	2000	Q-FR 2L/5S	Davies	Q-CX 5/25	Q-DA 5/75	60 × 160	1	**21·30**
Q-2L RCSX	2000	Q-EX 5/105	5000	Q-FR 5L/5US	Coil	Q-C 13/55	Q-DA 5/100	90 × 200	1	**40·00**

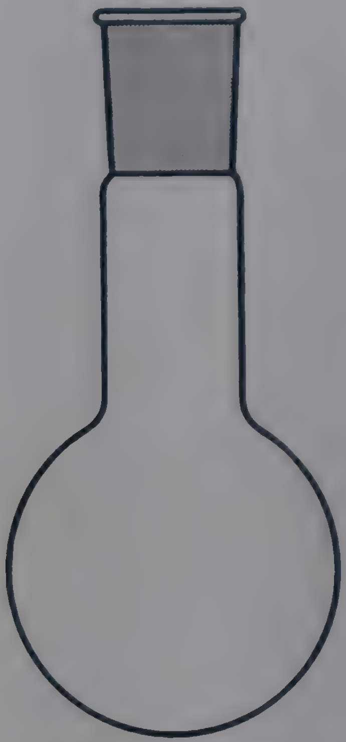
All items on this page are code *jx*

FLASKS

FLASKS, round bottom, short neck.

List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-FR 5/0S	5	10/19	5	2·15	0·47
Q-FR 5/1S	5	14/23	5	2·00	0·44
Q-FR 10/1S	10	14/23	5	2·40	0·52
Q-FR 25/1S	25	14/23	10	4·80	0·54
Q-FR 25/2S	25	19/26	5	2·40	0·52
Q-FR 25/3S	25	24/29	5	2·40	0·52
Q-FR 50/1S	50	14/23	10	5·90	0·66
Q-FR 50/2S	50	19/26	5	2·95	0·64
Q-FR 50/3S	50	24/29	10	5·90	0·66
Q-FR 100/1S	100	14/23	5	3·25	0·70
Q-FR 100/2S	100	19/26	5	3·25	0·70
Q-FR 100/3S	100	24/29	20	13·00	0·74
Q-FR 100/4S	100	29/32	5	3·50	0·76
Q-FR 100/5S	100	34/35	2	1·50	0·78
Q-FR 150/2S	150	19/26	2	1·40	0·72
Q-FR 150/3S	150	24/29	5	3·50	0·76
Q-FR 150/5S	150	34/35	2	1·50	0·78
Q-FR 250/2S	250	19/26	5	4·05	0·88
Q-FR 250/3S	250	24/29	20	15·00	0·86
Q-FR 250/4S	250	29/32	5	4·05	0·88
Q-FR 250/5S	250	34/35	5	4·30	0·94
Q-FR 500/2S	500	19/26	5	4·55	0·98
Q-FR 500/3S	500	24/29	20	17·20	1·00
Q-FR 500/4S	500	29/32	5	4·85	1·04
Q-FR 500/5S	500	34/35	5	5·00	1·08
Q-FR 1L/3S	1000	24/29	2	1·94	1·00
Q-FR 1L/4S	1000	29/32	2	2·20	1·14
Q-FR 1L/5S	1000	34/35	2	2·50	1·30
Q-FR 2L/3S	2000	24/29	2	3·40	1·75
Q-FR 2L/4S	2000	29/32	2	3·30	1·70
Q-FR 2L/5S	2000	34/35	2	3·30	1·70
Q-FR 3L/3S	3000	24/29	1	2·20	—
Q-FR 3L/5S	3000	34/35	1	2·30	—
Q-FR 5L/5US	5000	34/35	2	7·00	3·60
Q-FR 5L/9S	5000	55/44	1	3·75	—


Q-FR 25/1S

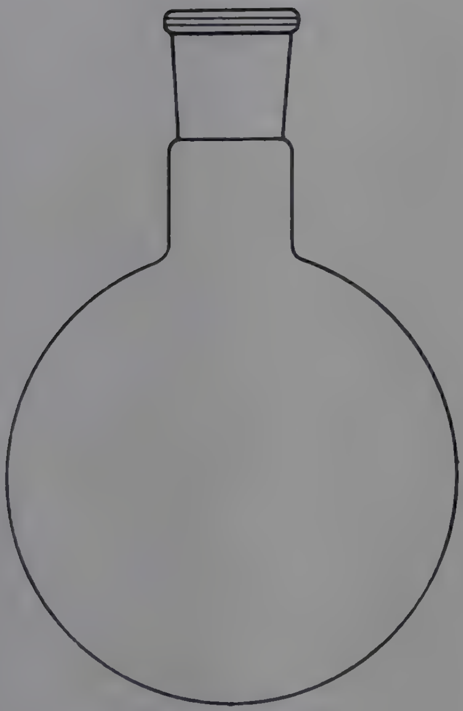

Q-FR 100/3M

FLASKS, round bottom, medium neck.

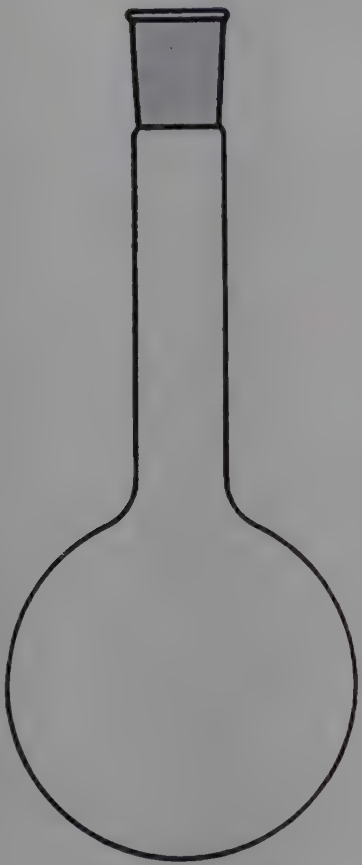
List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-FR 50/1M	50	14/23	2	1·18	0·62
Q-FR 50/3M	50	24/29	2	1·18	0·62
Q-FR 100/1M	100	14/23	1	0·65	—
Q-FR 100/2M	100	19/26	2	1·30	0·68
Q-FR 100/3M	100	24/29	2	1·30	0·68
Q-FR 150/3M	150	24/29	2	1·40	0·72
Q-FR 250/2M	250	19/26	1	0·86	—
Q-FR 250/3M	250	24/29	5	4·05	0·88
Q-FR 500/3M	500	24/29	5	4·55	0·98
Q-FR 500/4U	500	29/32	2	1·94	1·00
Q-FR 500/5M	500	34/35	1	1·00	—
Q-FR 1L/3UM	1000	24/29	2	2·00	1·04
Q-FR 1L/4UM	1000	29/32	2	2·40	1·25
Q-FR 1L/5M	1000	34/35	1	1·25	—
Q-FR 2L/3M	2000	24/29	1	1·75	—
Q-FR 2L/5UM	2000	34/35	1	1·75	—

All items on this page are code ***jx.***

FLASKS



Q-KFR 500/4S



Q-FR 500/3L

FLASKS, round bottom, short neck.

List No.	Capacity ml	Socket	Std. pack qty.	Std. pack
Clearfit				£
Q-KFR 5/1S	5	14/23	1	**0·60**
Q-KFR 10/1S	10	14/23	1	**0·59**
Q-KFR 25/1S	25	14/23	1	**0·59**
Q-KFR 25/2S	25	19/26	1	**0·59**
Q-KFR 25/3S	25	24/29	1	**0·65**
Q-KFR 50/1S	50	14/23	1	**0·70**
Q-KFR 50/2S	50	19/26	1	**0·70**
Q-KFR 50/3S	50	24/29	1	**0·70**
Q-KFR 50/4S	50	29/32	1	**0·75**
Q-KFR 100/1S	100	14/23	1	**0·80**
Q-KFR 100/2S	100	19/26	1	**0·75**
Q-KFR 100/3S	100	24/29	1	**0·75**
Q-KFR 100/4S	100	29/32	1	**0·80**
Q-KFR 150/2S	150	19/26	1	**0·80**
Q-KFR 150/3S	150	24/29	1	**0·86**
Q-KFR 250/2S	250	19/26	1	**0·91**
Q-KFR 250/3S	250	24/29	1	**0·86**
Q-KFR 250/4S	250	29/32	1	**0·97**
Q-KFR 500/2S	500	19/26	1	**1·20**
Q-KFR 500/3S	500	24/29	1	**0·97**
Q-KFR 500/4S	500	29/32	1	**1·10**
Q-KFR 1L/3S	1000	24/29	1	**1·15**
Q-KFR 1L/4S	1000	29/32	1	**1·25**
Q-KFR 2L/3S	2000	24/29	1	**1·90**
Q-KFR 2L/4S	2000	29/32	1	**1·85**
Q-KFR 3L/4S	3000	29/32	1	**2·35**
Q-KFR 5L/4S	5000	29/32	1	**3·60**

Regd

STANDARD JOINT FLASKS

FILTER FLASKS,
29/32 socket, capacities 500 ml and 1000 ml—see FJ-280.

IODINE FLASK,
24/29 cone and socket, capacity 250 ml—see FJ-260.

PEAR SHAPED FLASKS,
14/15 sockets, capacities 10 ml and 30 ml, single and two necks —see FJ-195 and FJ-196.

For full details and prices see entries in List No. sequence.

FLASKS, round bottom, long neck.

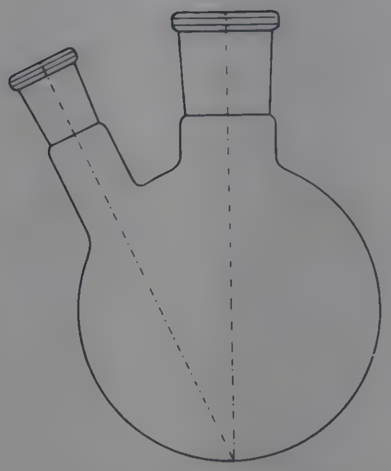
List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-FR 250/3L	250	24/29	1	**0·81**	—
Q-FR 500/3L	500	24/29	2	**2·00**	**1·04**
Q-FR 1L/3L	1000	24/29	2	**2·20**	**1·14**

All items on this page are code *jx*.

FLASKS

FLASKS, round bottom, two necks. With short centre neck and angled side neck.

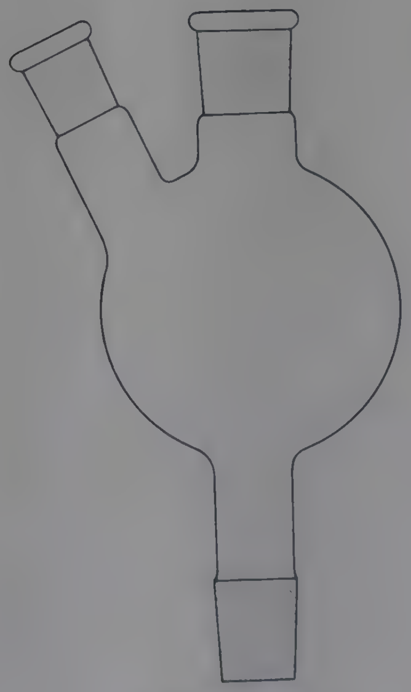
List No.	Capacity ml	Centre socket	Side socket	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-FR 100/3S/1A	100	24/29	14/23	2	2·60	1·35
Q-FR 250/3S/1A	250	24/29	14/23	2	2·70	1·40
Q-FR 250/3S/2A	250	24/29	19/26	2	3·00	1·55
Q-FR 500/3S/1A	500	24/29	14/23	2	3·00	1·55
Q-FR 500/3S/2A	500	24/29	19/26	5	8·00	1·75
Q-FR 1L/3S/1A	1000	24/29	14/23	2	3·40	1·75
Q-FR 2L/5S/2A	2000	34/35	19/26	1	2·65	—
Clearfit						
Q-KFR 100/3S/1A	100	24/29	14/23	1	1·55	—
Q-KFR 250/3S/1A	250	24/29	14/23	1	1·65	—
Q-KFR 250/3S/2A	250	24/29	19/26	1	1·70	—
Q-KFR 250/4S/4A	250	29/32	29/32	1	2·00	—
Q-KFR 500/4S/4A	500	29/32	29/32	1	2·05	—
Q-KFR 1L/3S/1A	1000	24/29	14/23	1	2·00	—



Q-KFR 250/3S/2A

FLASKS, round bottom, two necks and bottom outlet. Side socket size 19/26.

List No.	Capacity ml	Centre socket	Bottom cone	Std. pack qty.	Std. pack
Quickfit					£
Q-RA 332/250	250	24/29	24/29	1	2·60
Q-RA 552/500	500	34/35	34/35	1	2·80
Q-RA 552/1L	1000	34/35	34/35	1	3·00
Q-RA 552/2L	2000	34/35	34/35	1	3·55



Q-RA 332/250

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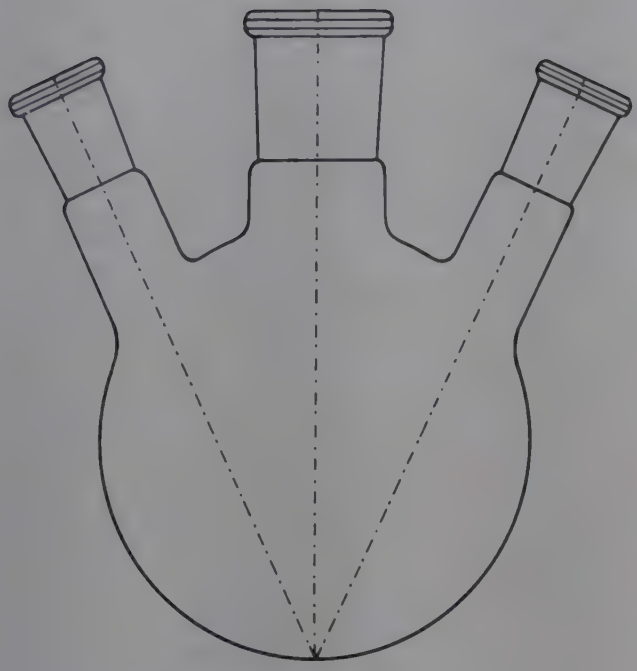
FLASKS

FLASKS, round bottom, three necks. With short centre neck and two angled side necks.

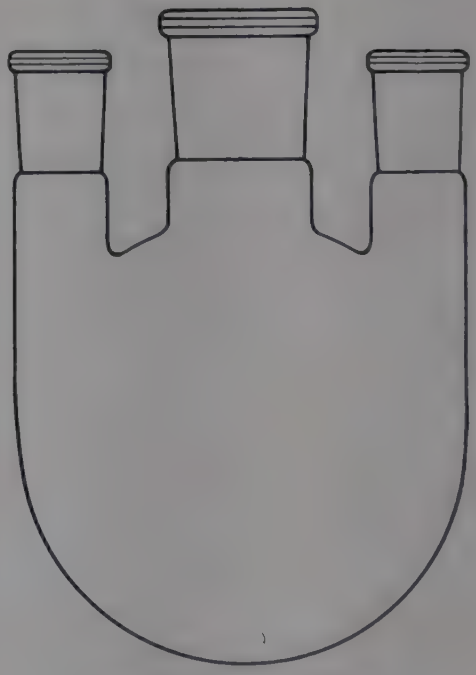


Q-KFR 500/3S/22A

List No.	Capacity ml	Centre socket	Side sockets	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-FR 250/3S/11A	250	24/29	14/23	2	3·70	1·95
Q-FR 250/3S/22A	250	24/29	19/26	5	11·00	2·40
Q-FR 500/3S/11A	500	24/29	14/23	2	4·00	2·10
Q-FR 500/3S/22A	500	24/29	19/26	5	11·75	2·55
Q-FR 1L/3S/11A	1000	24/29	14/23	2	4·40	2·30
Q-FR 1L/3S/22A	1000	24/29	19/26	2	5·00	2·60
Q-FR 1L/5S/22A	1000	34/35	19/26	2	5·50	2·85
Q-FR 2L/3US/22A	2000	24/29	19/26	1	3·50	—
Q-FR 2L/5S/22A	2000	34/35	19/26	1	3·40	—
Clearfit						
Q-KFR 250/2S/22A	250	19/26	19/26	1	2·70	—
Q-KFR 250/3S/22A	250	24/29	19/26	1	2·55	—
Q-KFR 250/3S/11A	250	24/29	14/23	1	2·25	—
Q-KFR 250/4S/11A	250	29/32	14/23	1	2·50	—
Q-KFR 500/2S/22A	500	19/26	19/26	1	2·90	—
Q-KFR 500/3S/22A	500	24/29	19/26	1	2·70	—
Q-KFR 500/4S/11A	500	29/32	14/23	1	2·50	—
Q-KFR 1L/3S/22A	1000	24/29	19/26	1	2·95	—
Q-KFR 1L/4S/44A	1000	29/32	29/32	1	3·70	—

FLASKS, round bottom, three parallel necks.

List No.	Capacity ml	Centre socket	Side sockets	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-FR 250/3S/22P	250	24/29	19/26	2	4·70	2·45
Q-FR 500/3S/22P	500	24/29	19/26	2	5·20	2·70
Q-FR 1L/3S/22P	1000	24/29	19/26	2	5·30	2·75
Q-FR 1L/5S/22P	1000	34/35	19/26	2	5·70	2·95
Q-FR 2L/3US/22P	2000	24/29	19/26	1	3·60	—
Q-FR 2L/5S/22P	2000	34/35	19/26	1	3·55	—
Q-FR 2L/5S/33P	2000	34/35	24/29	1	3·80	—
Q-FR 3L/5S/22P	3000	34/35	19/26	1	4·70	—
Q-FR 3L/5S/33P	3000	34/35	24/29	1	4·90	—
Q-FR 5L/5US/33P	5000	34/35	24/29	1	5·95	—
Clearfit						
Q-KFR 250/3S/22P	250	24/29	19/26	1	2·70	—
Q-KFR 250/4S/11P	250	29/32	14/23	1	2·65	—
Q-KFR 500/3S/22P	500	24/29	19/26	1	2·85	—
Q-KFR 500/4S/11P	500	29/32	14/23	1	2·70	—
Q-KFR 500/4S/44P	500	29/32	29/32	1	3·35	—
Q-KFR 1L/3S/22P	1000	24/29	19/26	1	3·15	—
Q-KFR 1L/4S/44P	1000	29/32	29/32	1	3·90	—
Q-KFR 2L/4S/44P	2000	29/32	29/32	1	4·30	—
Q-KFR 3L/4S/44P	3000	29/32	29/32	1	5·20	—
Q-KFR 5L/4S/44P	5000	29/32	29/32	1	6·20	—



Q-KFR 500/3S/22P

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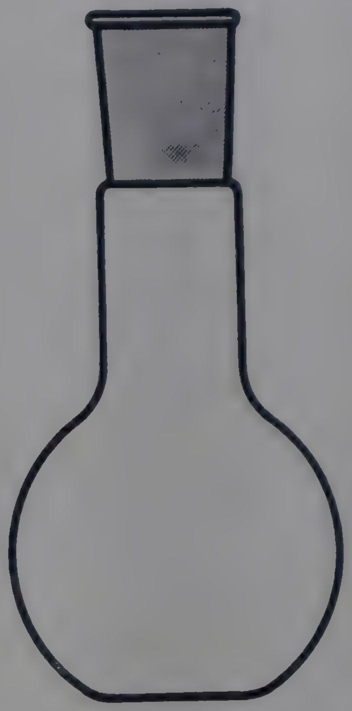
FLASKS

FLASKS, flat bottom, medium neck.

List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-FF 100/3M	100	24/29	2	1·30	0·68
Q-FF 150/3M	150	24/29	2	1·40	0·72
Q-FF 250/2M	250	19/26	2	1·60	0·84
Q-FF 250/3M	250	24/29	2	1·60	0·84
Q-FF 250/4M	250	29/32	2	1·60	0·84
Q-FF 500/3UM	500	24/29	2	1·72	0·88
Q-FF 500/4UM	500	29/32	2	1·82	0·94
Q-FF 1L/3M	1000	24/29	2	2·00	1·04

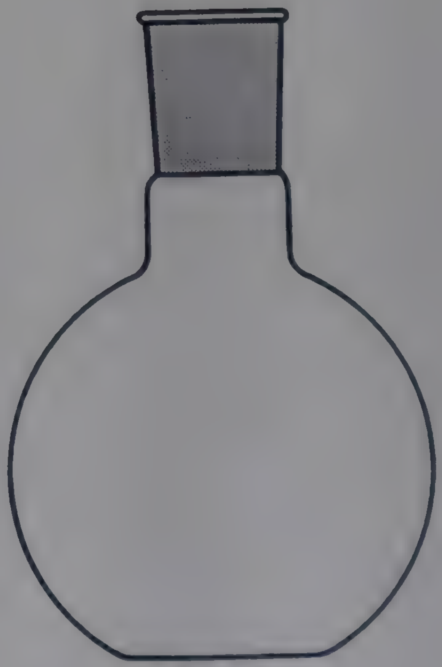


Q-FF 250/3M

FLASKS, flat bottom, short neck.

List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-FF 50/2S	50	19/26	2	1·20	0·62
Q-FF 50/3S	50	24/29	2	1·10	0·57
Q-FF 100/2S	100	19/26	2	1·30	0·68
Q-FF 100/3S	100	24/29	2	1·30	0·68
Q-FF 100/5S	100	34/35	2	1·50	0·78
Q-FF 150/2S	150	19/26	2	1·40	0·72
Q-FF 150/3S	150	24/29	2	1·40	0·72
Q-FF 150/4S	150	29/32	2	1·40	0·72
Q-FF 150/5S	150	34/35	2	1·50	0·78
Q-FF 250/2S	250	19/26	5	4·00	0·86
Q-FF 250/3S	250	24/29	5	3·75	0·82
Q-FF 250/4S	250	29/32	5	4·00	0·86
Q-FF 250/5S	250	34/35	5	4·30	0·92
Q-FF 500/3S	500	24/29	2	1·60	0·82
Q-FF 500/4S	500	29/32	2	1·82	0·94
Q-FF 500/5S	500	34/35	2	1·94	1·00
Q-FF 1L/3US	1000	24/29	2	2·00	1·04
Q-FF 1L/4US	1000	29/32	2	2·20	1·14
Q-FF 1L/5S	1000	34/35	2	2·40	1·25
Q-FF 2L/3S	2000	24/29	1	1·70	—
Q-FF 2L/4S	2000	29/32	1	1·75	—
Q-FF 2L/5S	2000	34/35	1	1·70	—
Clearfit					
Q-KFF 100/3S	100	24/29	1	0·80	—
Q-KFF 150/3S	150	24/29	2	1·70	0·88
Q-KFF 250/3S	250	24/29	1	0·85	—
Q-KFF 500/3S	500	24/29	1	0·91	—

AG **FLASKS, flat bottom,** with standard joints, capacities 150 ml to 500 ml—see FJ-110 in List No. sequence.



Q-FF 500/4S

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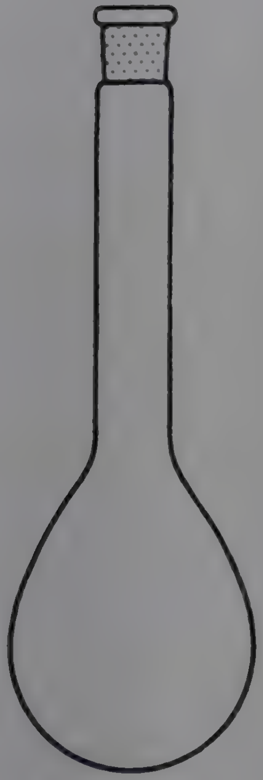
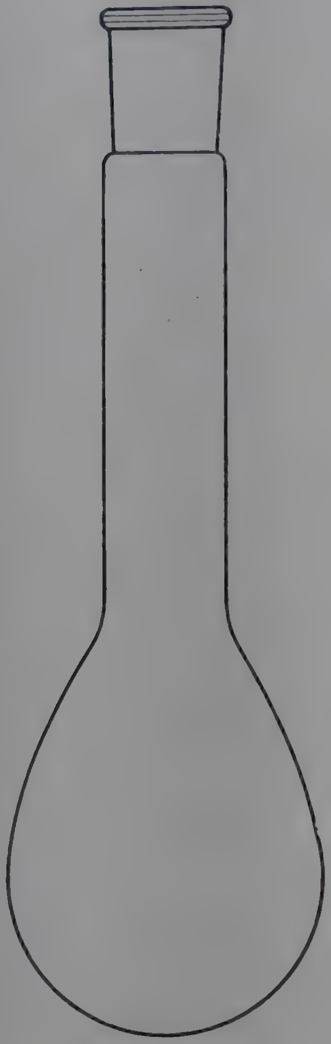
FLASKS

FLASKS, Kjeldahl, long neck, round bottom.

List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-FK 100/3L	100	24/29	2	1·72	0·90
Q-FK 200/3L	200	24/29	2	1·82	0·94
Q-FK 300/3L	300	24/29	2	1·94	1·00
Q-FK 500/3L	500	24/29	2	2·00	1·04
Q-FK 800/3L	800	24/29	2	2·60	1·35
Clearfit					
Q-KFK 300/3L	300	24/29	1	1·10	—
Q-KFK 500/3L	500	24/29	1	1·15	—
Q-KFK 800/3L	800	24/29	1	1·45	—

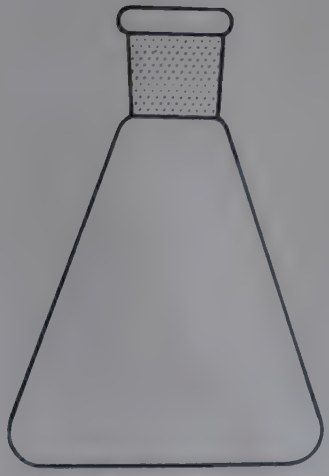

Q-FK 200/3L

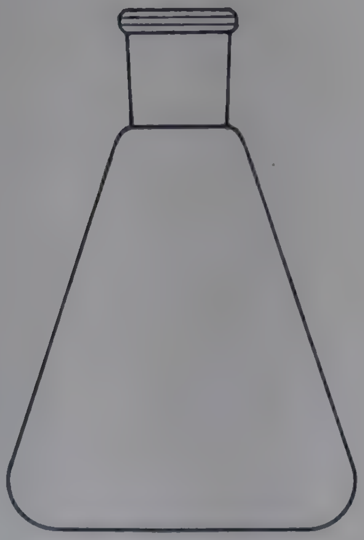

Q-KFK 500/3L

(AG) **FLASKS, conical,** 24/29 socket, capacities 100 ml to 1000 ml—see FJ-058 in List No. sequence.

FLASKS, conical.

List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-FE 5/0	5	10/19	5	3·50	0·76
Q-FE 10/1	10	14/23	5	3·50	0·76
Q-FE 25/0	25	10/19	5	3·25	0·70
Q-FE 25/1	25	14/23	10	6·50	0·74
Q-FE 50/1	50	14/23	10	6·50	0·74
Q-FE 50/2	50	19/26	10	6·50	0·74
Q-FE 50/3	50	24/29	10	6·50	0·74
Q-FE 100/1	100	14/23	10	7·50	0·86
Q-FE 100/2	100	19/26	10	7·00	0·78
Q-FE 100/3	100	24/29	10	7·00	0·78
Q-FE 150/2	150	19/26	5	4·00	0·86
Q-FE 150/3	150	24/29	5	4·00	0·86
Q-FE 250/2	250	19/26	10	8·00	0·90
Q-FE 250/3	250	24/29	10	7·50	0·86
Q-FE 250/4	250	29/32	10	8·00	0·90
Q-FE 250/5	250	34/35	10	8·00	0·90
Q-FE 500/3	500	24/29	5	4·00	0·86
Q-FE 500/4	500	29/32	5	4·55	0·98
Q-FE 500/5	500	34/35	5	4·30	0·92
Q-FE 1L/3	1000	24/29	5	5·00	1·08
Q-FE 1L/4	1000	29/32	5	5·50	1·18
Q-FE 1L/5	1000	34/35	5	5·50	1·18
Q-FE 2L/5	2000	34/35	1	1·75	—
Clearfit					
Q-KFE 10/1	10	14/23	1	0·80	—
Q-KFE 25/1	25	14/23	1	0·75	—
Q-KFE 50/1	50	14/23	1	0·75	—
Q-KFE 50/2	50	19/26	1	0·75	—
Q-KFE 50/3	50	24/29	1	0·75	—
Q-KFE 100/2	100	19/26	1	0·80	—
Q-KFE 100/3	100	24/29	1	0·80	—
Q-KFE 150/3	150	24/29	1	0·91	—
Q-KFE 250/3	250	24/29	1	0·91	—
Q-KFE 250/4	250	29/32	1	0·91	—
Q-KFE 500/3	500	24/29	1	0·97	—
Q-KFE 500/4	500	29/32	1	1·00	—
Q-KFE 1L/3	1000	24/29	1	1·20	—


Q-FE 250/3

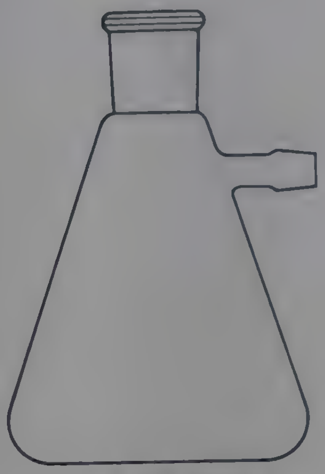

Q-KFE 250/3

All items on this page are code ***jx.***

FLASKS

FLASKS, Buchner or filtration.

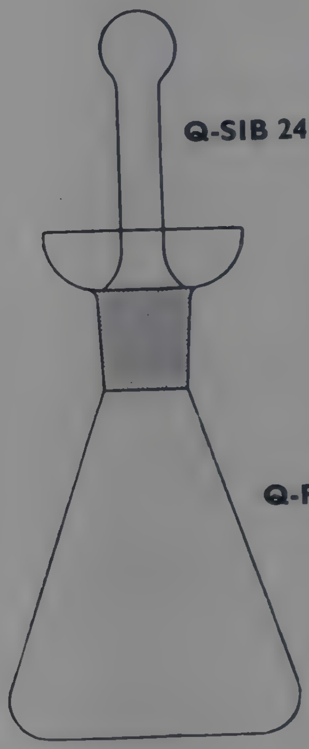
List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-FB 100/2	100	19/26	5	7·00	1·50
Q-FB 250/3	250	24/29	5	8·25	1·80
Q-FB 500/3	500	24/29	2	3·50	1·80
Q-FB 1L/3	1000	24/29	2	5·00	2·60
Clearfit					
Q-KFB 100/2	100	19/26	1	1·50	—
Q-KFB 100/3	100	24/29	1	1·50	—
Q-KFB 250/3	250	24/29	1	1·75	—
Q-KFB 250/4	250	29/32	1	1·85	—
Q-KFB 500/3	500	24/29	1	1·95	—
Q-KFB 500/4	500	29/32	1	2·00	—
Q-KFB 1L/3	1000	24/29	1	2·65	—



Q-KFB 250/3

FLASKS, iodine, to BS 2735.

List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-FIB 250/3	250	24/29	2	3·70	1·90
Q-FIB 500/3	500	24/29	2	4·10	2·15
Q-SIB 24 STOPPER, for iodine flasks } For price see entry on page 586.					



Q-SIB 24

Q-FIB 250/3

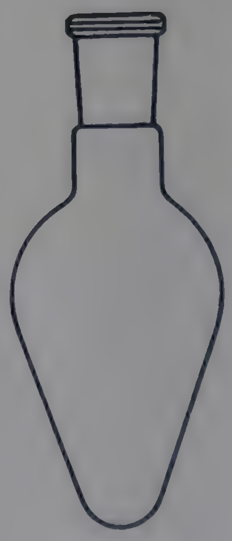
PEAR SHAPED SEMI-MICRO FLASKS

Single neck

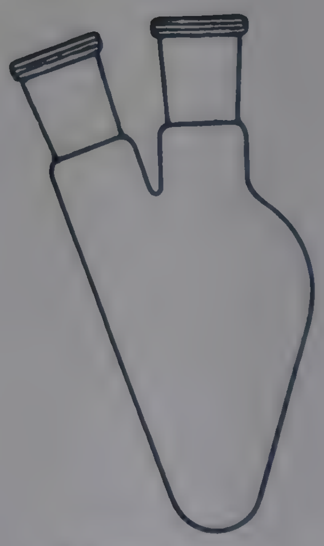
List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-FP 5/0	5	10/19	2	1·26	0·66
Q-FP 10/1	10	14/23	2	1·24	0·64
Q-FP 25/0	25	10/19	2	1·40	0·72
Q-FP 25/1	25	14/23	2	1·24	0·64
Q-FP 50/1	50	14/23	2	1·24	0·64
Q-FP 100/2	100	19/26	2	1·72	0·90
Clearfit					
Q-KFP 5/1	5	14/23	1	0·70	—
Q-KFP 10/1	10	14/23	1	0·74	—
Q-KFP 25/1	25	14/23	1	0·80	—
Q-KFP 50/1	50	14/23	1	0·86	—

Two necks, side neck at angle

List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-FP 50/1/1A	50	14/23	2	2·70	1·40
Clearfit					
Q-KFP 50/1/1A	50	14/23	1	1·75	—



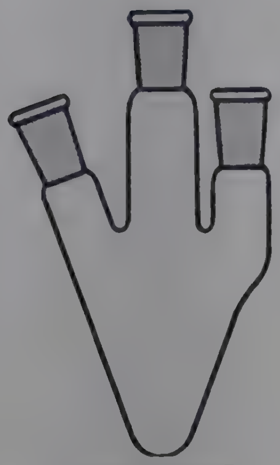
Q-KFP 10/1



Q-KFP 50/1/1A

All items on this page are code *jx*.

FLASKS



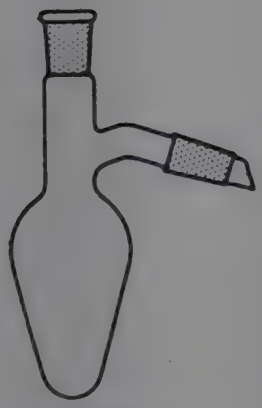
Q-FP 25/0AP

Three necks, one side neck parallel, other angled

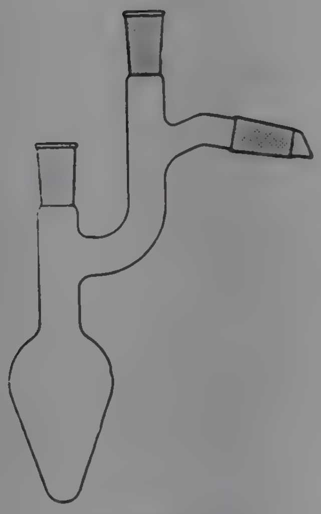
List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-FP 25/0AP	25	10/19	2	4·20	2·20

Distillation

List No.	Capacity ml	Socket and Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MD 2/10	10	14/23	2	2·70	1·40
Q-MD 2/25	25	14/23	2	2·50	1·30
Q-MD 2/50	50	14/23	2	2·70	1·40
Q-MD 2/100	100	14/23	2	3·10	1·60



Q-MD 2/25



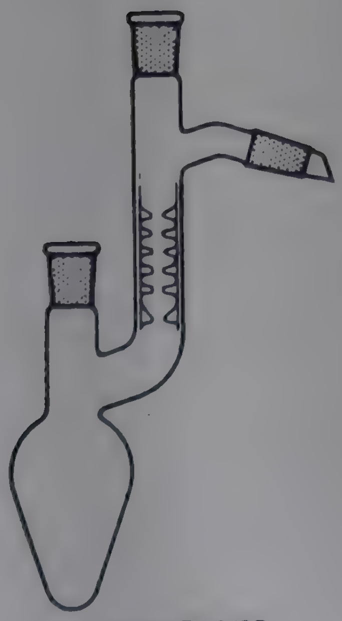
Q-MD 3/10

Claisen

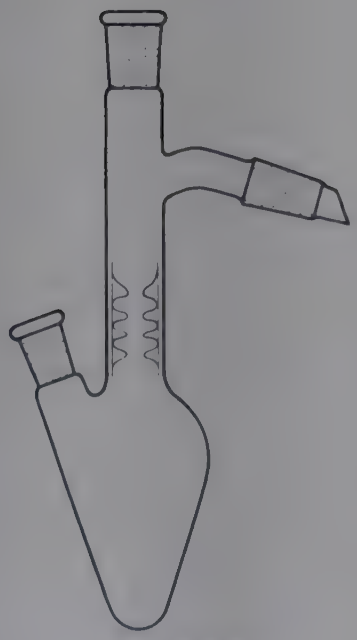
List No.	Capacity ml	Socket and Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MD 3/10	10	14/23	2	4·10	2·15
Q-MD 3/0/25	25	10/19	2	3·90	2·05
Q-MD 3/25	25	14/23	2	4·00	2·10
Q-MD 3/50	50	14/23	2	4·10	2·15
Q-MD 3/100	100	14/23	2	4·40	2·30

Claisen—Vigreux

List No.	Capacity ml	Socket and Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MD 4/25	25	14/23	2	5·20	2·70
Q-MD 4/50	50	14/23	2	5·30	2·75
Q-MD 4/100	100	14/23	5	14·25	3·10



Q-MD 4/25



Q-MD 7/50

Vigreux—with angled neck, main socket and side cone 14/23.

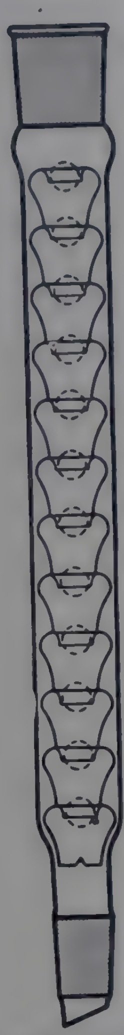
List No.	Capacity ml	Angle socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MD 7/10	10	10/19	2	5·00	2·60
Q-MD 7/25	25	10/19	2	5·00	2·60
Q-MD 7/50	50	10/19	2	5·20	2·70

All items on this page are code *jx*.

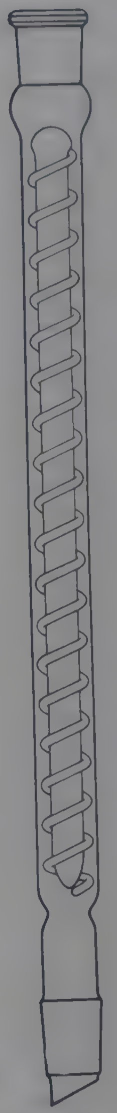
FRACTIONATION

FRACTIONATING COLUMNS

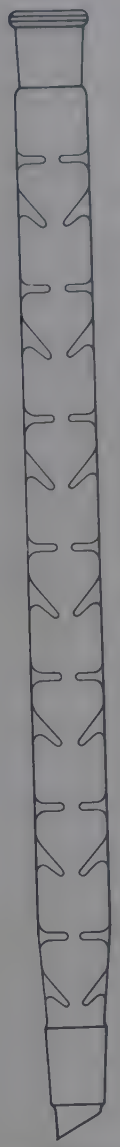
List No.	Type	Socket	Cone	Effective length mm	Std. pack qty.	Std. pack	Each
						£	£
Quickfit							
Q-FC 1/22	Dufton	19/26	19/26	300	1	3·55	—
Q-FC 2/23	Dufton	24/29	24/29	300	1	4·10	—
Q-FC 3/13	Vigreux	24/29	24/29	360	2	5·80	3·00
Q-FC 6/23A	Jacket only to take 12 bulbs (and bubbles)	34/35	24/29	225	2	5·50	2·85
Q-FC 6/00	Pear bulbs, for above	—	—	—	5	1·45	0·34
Q-FC 6/10	Bubbles, for above	—	—	—	5	0·75	0·21
Q-FC 7/23	Plain columns ...	24/29	24/29	250	For prices see entries on page 564		
Q-FC 7/43	Plain columns ...	24/29	24/29	500			
Q-FC 7/53	Plain columns ...	24/29	24/29	750			
Q-FC 8/23	Plain columns ...	34/35	24/29	250	2	3·10	1·60
Q-FC 8/43	Plain columns ...	34/35	24/29	500	1	2·15	—
Clearfit							
Q-KFC 1/22	Dufton	19/26	19/26	300	1	3·75	—
Q-KFC 2/23	Dufton	24/29	24/29	300	1	4·30	—
Q-KFC 3/13	Vigreux	24/29	24/29	360	1	3·15	—
Q-KFC 3/14	Vigreux	29/32	29/32	360	1	3·60	—
Q-KFC 3/23	Vigreux	24/29	24/29	600	1	5·05	—
Q-KFC 7/23	Plain columns ...	24/29	24/29	250	1	1·55	—
Q-KFC 7/43	Plain columns ...	24/29	24/29	500	1	1·85	—
Q-KFC 7/44	Plain columns ...	29/32	29/32	500	1	2·20	—
Q-KFC 7/53	Plain columns ...	24/29	24/29	750	1	2·15	—



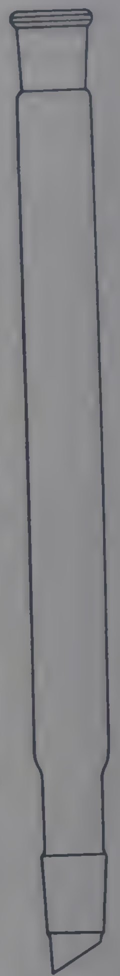
Q-FC 6/23A with Q-FC 6/00 and Q-FC 6/10



Q-KFC 2/23



Q-KFC 3/13

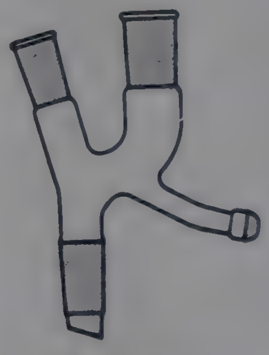


Q-KFC 7/23

Ⓐ **Standard joint fractionating columns and stillheads see entries under page heading DISTILLATION**

REFLUX HEADS

List No.	Description	Socket for reflux condenser	Thermo socket	Cone for column	Cone for condenser	Std. pack qty.	Std. pack
							£
Quickfit							
Q-FC 14/00	Cold finger condenser ...	—	—	—	19/26	For price see entry on page 566	
Q-FC 15/32	Sluice type head ...	19/26	14/23	24/29	—	1	2·75
Q-FC 15/2	Distillate delivery adapter with fine adjustment stopcock for Q-FC 15/32			—	19/26	1	6·00
Clearfit							
Q-KFC 14/00	Cold finger condenser ...	—	—	—	19/26	For price see entry on page 566	

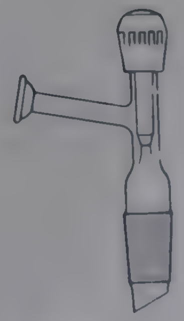


Q-FC 15/32

PACKING, for plain columns, in pack of approx. 1 litre.

List No.	Description	Diameter mm	Effective length mm	Pack
				£
Quickfit				
Q-FC 8/06	Raschig rings, soda-lime glass ...	6	6	3·10

For suitable spiral supports for column packing see Q-EX 13/12 and Q-EX 13/23 on page 567.



Q-FC 15/2

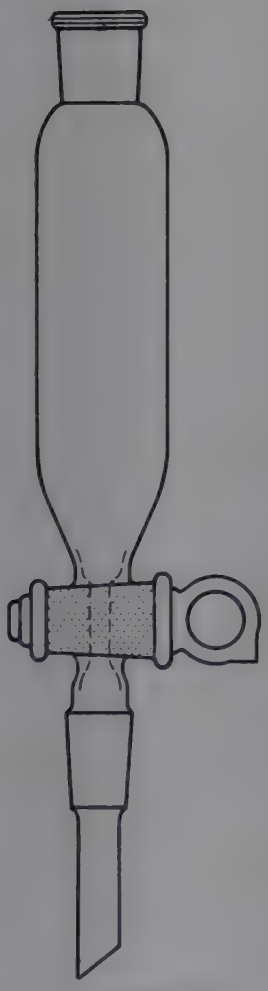
All items on this page are code *jx*.

FUNNELS

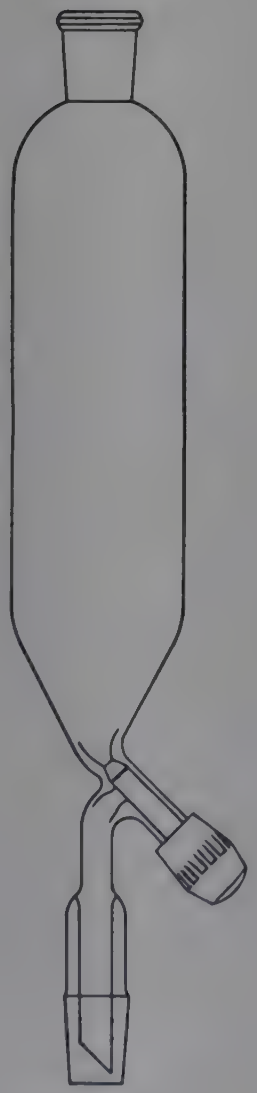
SEPARATING AND DROPPING FUNNELS

Cylindrical, with socket and plain stem.

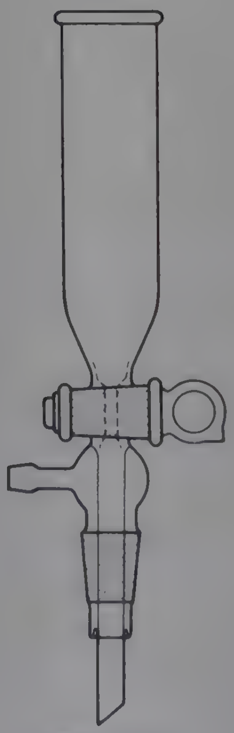
List No.	Capacity ml	Socket	Std. pack qty.	Std. Pack	Each
Quickfit				£	£
Q-D 11/25	25	14/23	2	4·40	2·30
Q-D 11/50	50	14/23	2	4·50	2·35
Q-D 12/100	100	19/26	2	4·70	2·45
Q-D 12/250	250	19/26	2	6·10	3·20
Q-D 12/500	500	19/26	1	3·40	—



Q-KD 1/22



Q-KD 31/2/100



Q-D 4/23

(AG) **Cylindrical dropping funnel,** 14/15 standard joints, capacity 30 ml—see FP-587 in List No. sequence.

Cylindrical, with socket and cone.

List No.	Capacity ml	Socket and Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-D 1/00	20	10/19†	2	5·50	2·85
Q-D 1/01	25	14/23	2	5·20	2·70
Q-D 1/11	50	14/23	2	5·20	2·70
Q-D 1/21	100	14/23	2	5·50	2·85
Q-D 1/22	100	19/26	2	5·90	3·10
Q-D 1/32	250	19/26	2	8·00	4·10
Q-D 1/42	500	19/26	2	8·80	4·50
Q-D 1/62	1000	19/26	2	10·10	5·20
Clearfit					
Q-KD 1/11	50	14/23	1	2·70	—
Q-KD 1/21	100	14/23	1	2·90	—
Q-KD 1/22	100	19/26	1	3·10	—
Q-KD 1/2/44	100	29/32	1	3·25	—
Q-KD 1/32	250	19/26	1	4·15	—
Q-KD 1/34	250	29/32	1	4·25	—
Q-KD 1/44	500	29/32	1	4·50	—
Q-KD 1/64	1000	29/32	1	5·15	—
Clearfit/Rotaflo					
Q-KD 31/1/50	50	14/23	1	4·20	—
Q-KD 31/1/100	100	14/23	1	4·30	—
Q-KD 31/2/100	100	19/26	1	4·55	—
Q-KD 31/2/250	250	19/26	1	5·55	—
Q-KD 31/2/500	500	19/26	1	6·00	—

† Q-D 1/00 has a 10/13 cone.

Cylindrical, open top and 19/26 cone.

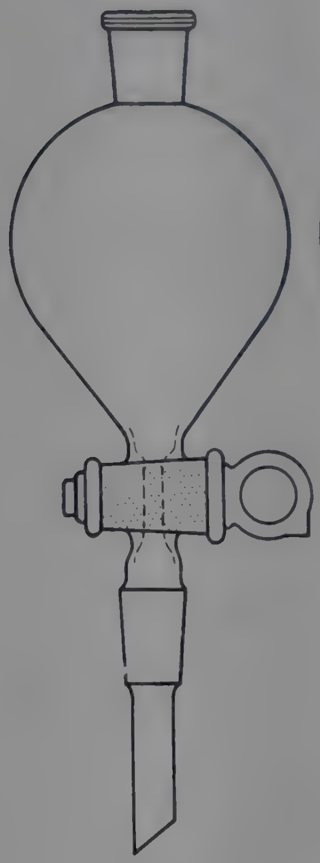
List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-D 3/12	50	—	2	5·90	3·10
Q-D 3/22	100	—	2	6·00	3·10
Q-D 3/32	250	—	2	6·50	3·40

Cylindrical, open top, with gas outlet tube and 24/29 cone.

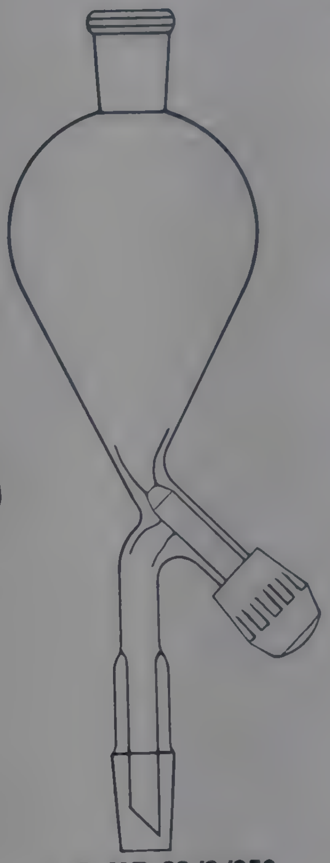
List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-D 4/23	100	—	2	8·80	4·60

All items on this page are code *jx*.

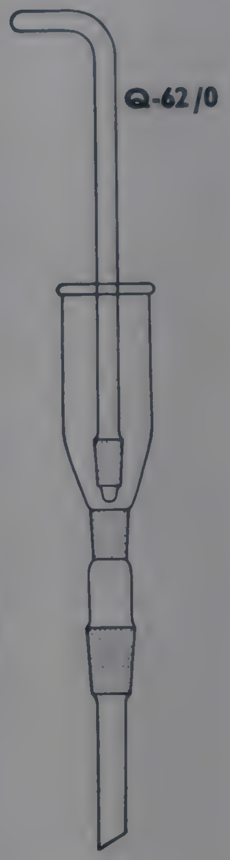
FUNNELS



Q-KD 2/32



Q-KD 32/2/250



Q-D 62/50

SEPARATING AND DROPPING FUNNELS
(continued)

Conical, with socket and short stem.

List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-D 82/100	100	19/26	2	5·70	2·95
Q-D 83/250	250	24/29	2	7·40	3·80
Q-D 83/500	500	24/29	1	4·45	—
Q-D 84/1L	1000	29/32	1	4·85	—

Pear shape, with socket and cone.

List No.	Capacity ml	Socket and cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-D 2/01	25	14/23	2	5·40	2·75
Q-D 2/11	50	14/23	2	5·50	2·80
Q-D 2/12	50	19/26	2	5·70	2·95
Q-D 2/21	100	14/23	2	5·70	2·95
Q-D 2/22	100	19/26	2	5·80	3·00
Q-D 2/31	250	14/23	2	6·50	3·30
Q-D 2/32	250	19/26	2	6·70	3·50
Q-D 2/42	500	19/26	2	6·90	3·60
Q-D 2/62	1000	19/26	1	4·75	—
Clearfit					
Q-KD 2/11	50	14/23	1	2·90	—
Q-KD 2/21	100	14/23	1	2·95	—
Q-KD 2/22	100	19/26	1	3·00	—
Q-KD 2/31	250	14/23	1	3·40	—
Q-KD 2/32	250	19/26	1	3·45	—
Q-KD 2/42	500	19/26	1	3·55	—
Clearfit/Rotaflo					
Q-KD 32/1/50	50	14/23	1	4·40	—
Q-KD 32/1/100	100	14/23	1	4·40	—
Q-KD 32/2/100	100	19/26	1	4·45	—
Q-KD 32/2/250	250	19/26	1	4·80	—
Q-KD 32/2/500	500	19/26	1	5·65	—

Pear shape, with socket and plain stem.

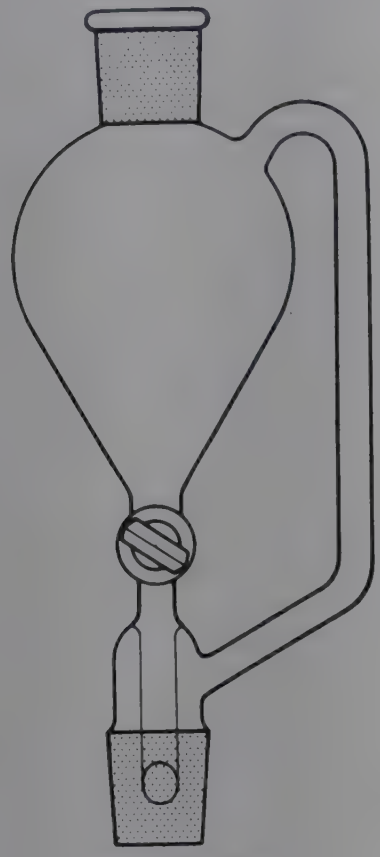
List No.	Capacity ml	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-D 22/50	50	19/26	2	4·80	2·45
Q-D 22/100	100	19/26	2	4·90	2·50
Q-D 22/250	250	19/26	2	5·80	3·00
Q-D 22/500	500	19/26	2	6·30	3·20
Q-D 22/1L	1000	19/26	1	4·15	—

Plug type, stem with cone, 50 ml capacity.

List No.	Part	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-D 62/50	Funnel	10/19	19/26	2	3·80	1·95
Q-D 62/0	Plug	—	10/19	5	2·85	0·60

All items on this page are code *jx*.

FUNNELS



Q-DE 250/33

PRESSURE EQUALISATION FUNNELS

List No.	Type	Capacity ml	Cone and Socket	Std. pack qty.	Std. pack
Quickfit					£
Q-DE 100/22	Pear shape	100	19/26	1	4·85
Q-DE 250/33	Pear shape	250	24/29	1	5·60
Q-DEC 500/33	Cylindrical	500	24/29	1	6·00

INTERCHANGEABLE KEYS and retaining rings

List No.	Key bore	To fit	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-D 5/1	1 mm	D 1/00, SC 10/1	5	3·50	0·76
Q-D 5/42	2 mm	DE, DEC, D funnels MF 11, MF 14 adapters SC 10/4, SC 10/42 stopcocks	5	3·50	0·76
Q-D 5/4	4 mm	Ditto	5	3·25	0·70
				Std. pack qty.	Std. pack
Q-D 5/4R	**Plastics retaining rings,** for above keys.			100	2·00

FILTER FUNNEL, with perforated plate, Hirsch type, cone 19/26.

List No.	Disk dia.	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-SF 42/2	24 mm	2	3·90	2·00

SINTAGLASS FILTER FUNNELS

- 24/29 or 29/32 cone on stems
- capacities 140 to 700 ml
- porosities 3, 4 and 5

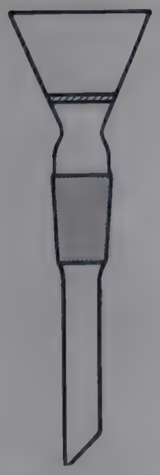
For details and prices see FM-703 et seq. in List No. sequence.

WILLSTATTER FILTER

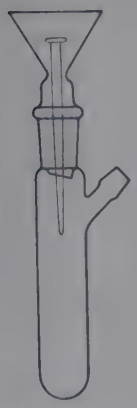
The precipitate is retained on a small circle of filter paper (cut with a cork borer) supported on the glass 'nail'. All joints 10/19.

List No.	Description	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-17 MU	**Assembly**	2	3·90	2·00
	Components			
Q-MU 39/10/0	Filter funnel	5	4·55	0·98
Q-MU/WN	Willstatter nail	2	0·54	0·30
Q-MD 60	Receiver tube		For price see entry on page 581	

Ⓐ **Willstatter filter,** 14/15 cone, capacity 5 ml—see FP-290 in List No. sequence.



Q-SF 42/2



Q-17 MU

All items on this page are code *jx*.

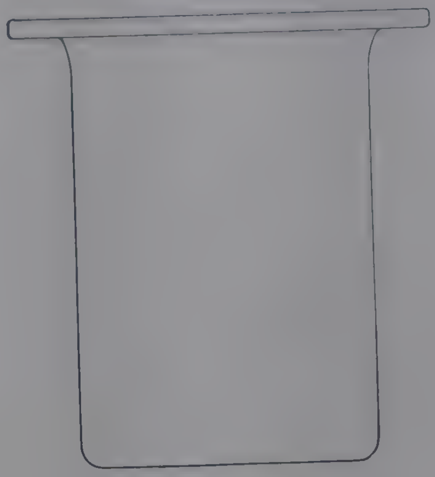
REACTION VESSELS

For explanation of flat flange sizes and additional information see page 562.

Flat bottom (Culture Vessels)

List No.	Capacity ml	Flange i.d. mm	JR-260 clip to fit	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-FV 500	500	75	JC 75F	1	3·55	—
Q-FV IL	1000	100	JC 100F	2	6·50	3·30

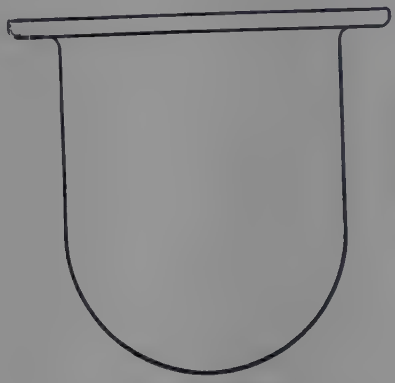
Q-FV IL is not suitable for use under vacuum.

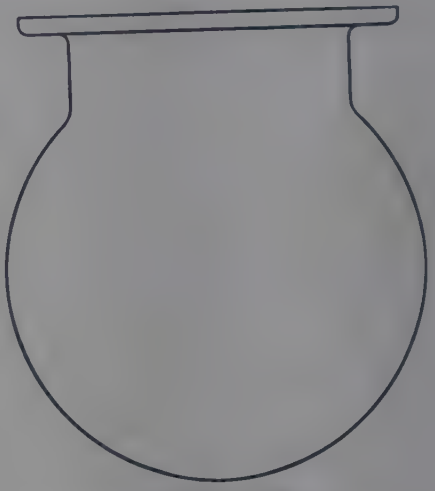

Q-FV IL

Round bottom

List No.	Capacity ml	Flange i.d. mm	JR-260 clip to fit	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-FR 100F	100	50	JC 50F	1	2·05	—
Q-FR 250F	250	75	JC 75F	2	5·20	2·70
Q-FR 500F	500	75	JC 75F	2	5·80	3·00
Q-FR 700F	700	100	JC 100F	5	17·75	3·80
Q-FR ILF	1000	100	JC 100F	2	7·00	3·60
Q-FR 2LF	2000	100	JC 100F	1	4·30	—
Q-FR 5LF	5000	100	JC 100F	1	5·75	—
Q-FR 10LF	10,000	100	JC 100F	1	6·65	—
Q-FR 20LF	20,000	100	JC 100F	1	10·85	—

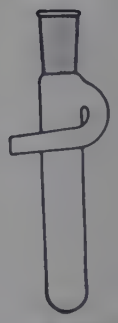
LIDS, for above vessels see flat flange adapters, page 562.
JR-260 Joint clips. For details and prices see entry in List No. sequence.

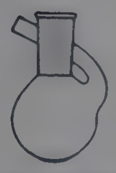

Q-FR 700F


Q-FR ILF
(Q-FR 100F to Q-FR 500F and Q-FR 2LF to Q-FR 20LF are similar)

RECEIVERS

List No.	Capacity approx.	Socket	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MD 60	5 ml	10/19	10	8·00	0·90
Q-MD 61	10 ml	14/23	10	8·00	0·90
Q-MD 62	25 ml	14/23	5	4·00	0·84

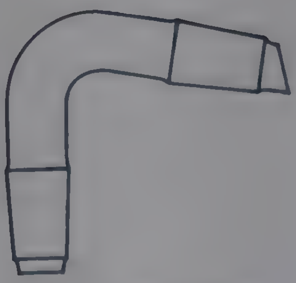

Q-MD 61


Q-MD 62

STILLHEADS

RECOVERY BENDS, sloping.

List No.	Flask cone	Condenser cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-SH 1/11	14/23	14/23	5	2·95	0·62
Q-SH 1/22	19/26	19/26	5	3·50	0·76
Q-SH 1/23	24/29	19/26	5	4·30	0·92
Q-SH 1/33	24/29	24/29	5	4·30	0·92
Clearfit					
Q-KSH 1/11	14/23	14/23	1	0·97	—
Q-KSH 1/22	19/26	19/26	1	1·00	—
Q-KSH 1/33	24/29	24/29	1	1·20	—

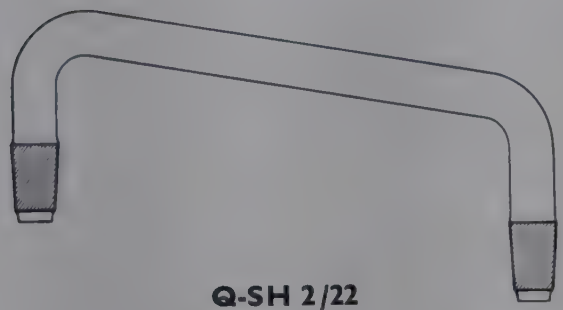

Q-KSH 1/22

All items on this page are code ***jx.***

STILLHEADS

(continued)

RECOVERY BENDS, vertical.

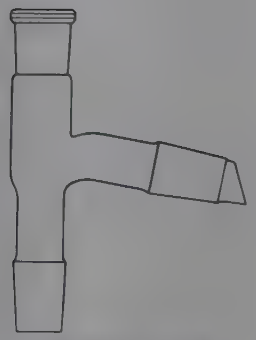


Q-SH 2/22

List No.	Flask cone	Condenser cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-SH 2/11	14/23	14/23	1	0·75	—
Q-SH 2/22	19/26	19/26	2	2·00	1·04
Q-SH 2/23	24/29	19/26	1	1·20	—
Q-SH 2/33	24/29	24/29	2	2·60	1·35

RECOVERY HEADS

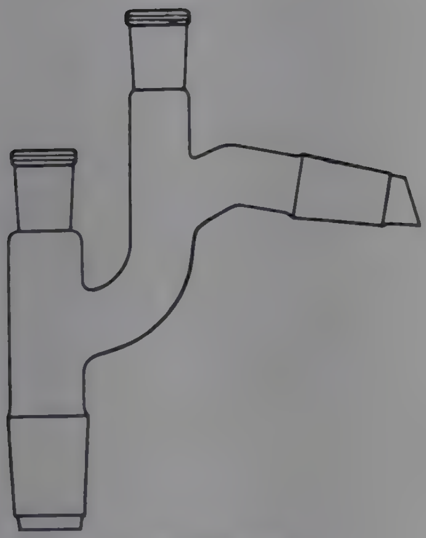
With 14/23 thermometer socket (except Q-SH 4/0, which has 10/19 and Q-SH 4/2 which has 19/26).



Q-KSH 4/22

List No.	Flask cone	Condenser cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-SH 4/0	10/19	10/19	5	5·50	1·20
Q-SH 4/1	14/23	14/23	10	11·00	1·25
Q-SH 4/2	19/26	19/26	5	6·75	1·45
Q-SH 4/22	19/26	19/26	10	11·00	1·25
Q-SH 4/23	24/29	19/26	5	5·75	1·25
Q-SH 4/24	29/32	19/26	1	1·10	—
Q-SH 4/25	34/35	19/26	1	1·40	—
Q-SH 4/33	24/29	24/29	5	6·00	1·30
Q-SH 4/35	34/35	24/29	2	3·10	1·60
Q-SH 4/55	34/35	34/35	2	4·00	2·10
Clearfit, with 14/23 socket (except Q-KSH 4/2 and Q-KSH 4/4 which have 19/26 and 29/32 respectively).					
Q-KSH 4/1	14/23	14/23	1	1·40	—
Q-KSH 4/22	19/26	19/26	1	1·45	—
Q-KSH 4/2	19/26	19/26	1	1·60	—
Q-KSH 4/33	24/29	24/29	1	1·50	—
Q-KSH 4/4	29/32	29/32	1	1·90	—

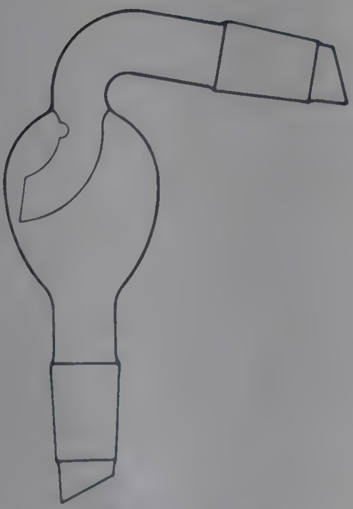
CLAISEN STILLHEADS, sloping, all sockets 14/23.



Q-KSH 6/22

List No.	Flask cone	Condenser cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-SH 6/1	14/23	14/23	5	8·75	1·90
Q-SH 6/22	19/26	19/26	5	8·50	1·85
Q-SH 6/23	24/29	19/26	5	8·75	1·90
Q-SH 6/25	34/35	19/26	1	2·05	—
Q-SH 6/33	24/29	24/29	1	2·10	—
Clearfit					
Q-KSH 6/1	14/23	14/23	1	2·00	—
Q-KSH 6/22	19/26	19/26	1	2·00	—
Q-KSH 6/33	24/29	24/29	1	2·30	—

SPLASH HEADS, pear shape, sloping.



Q-KSH 7/43

List No.	Cone fitting flask or column	Cone fitting condenser	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-SH 7/02	19/26	19/26	2	4·20	2·15
Q-SH 7/03	24/29	19/26	2	4·10	2·10
Q-SH 7/05	34/35	19/26	1	2·35	—
Clearfit					
Q-KSH 7/02	19/26	19/26	1	2·30	—
Q-KSH 7/43	24/29	24/29	1	2·45	—
Q-KSH 7/0/44	29/32	29/32	1	2·70	—

All items on this page are code *jx*.

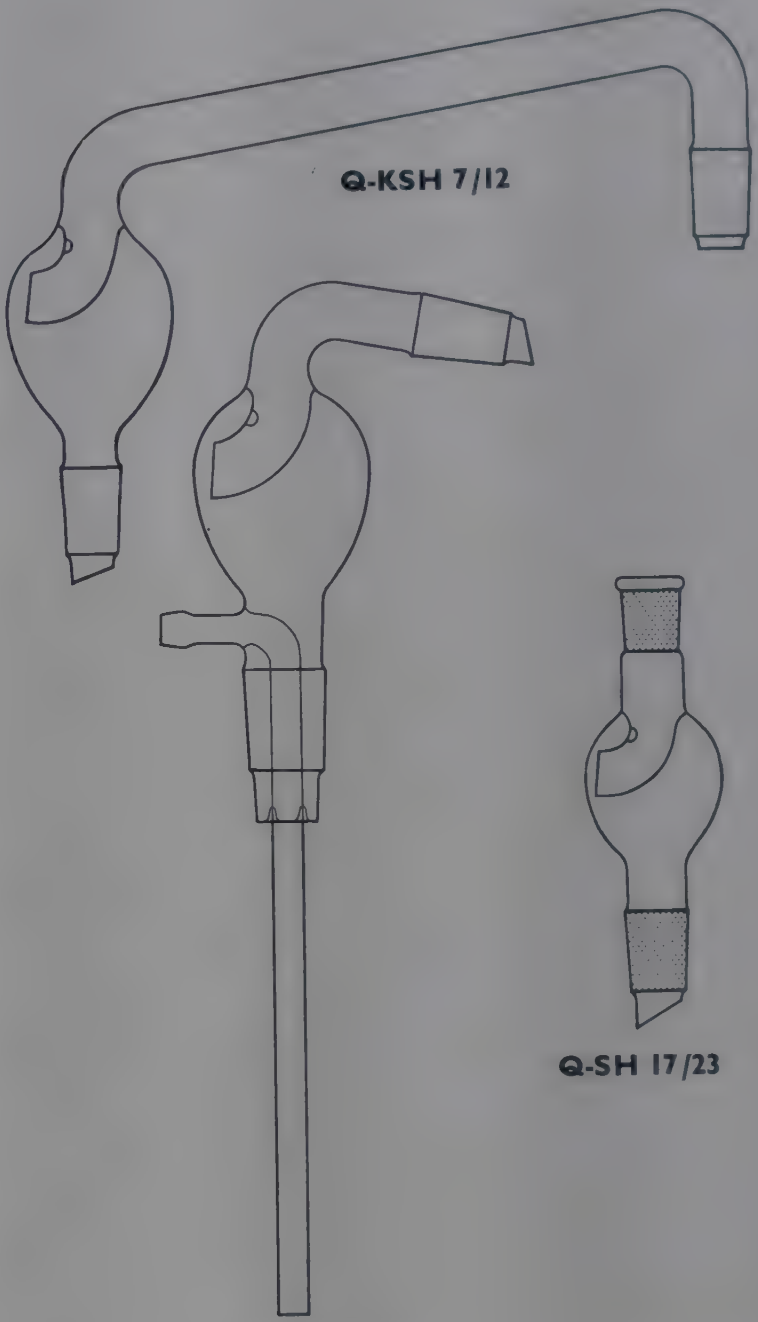
STILLHEADS
(continued)

SPLASH HEADS, pear shape, vertical.

List No.	Cone fitting flask or column	Cone fitting condenser	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-SH 7/12	19/26	19/26	5	11·75	2·50
Q-SH 7/13	24/29	19/26	2	4·60	2·35
Q-SH 7/53	24/29	24/29	2	5·40	2·75
Clearfit					
Q-KSH 7/12	19/26	19/26	1	2·50	—
Q-KSH 7/53	24/29	24/29	1	2·85	—

STEAM DISTILLATION HEADS, pear shape, sloping.

List No.	Cone fitting flask or column	Cone fitting condenser	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-SH 7/23	24/29	19/26	5	13·25	2·90
Clearfit					
Q-KSH 7/63	24/29	24/29	1	2·85	—



Q-KSH 7/12

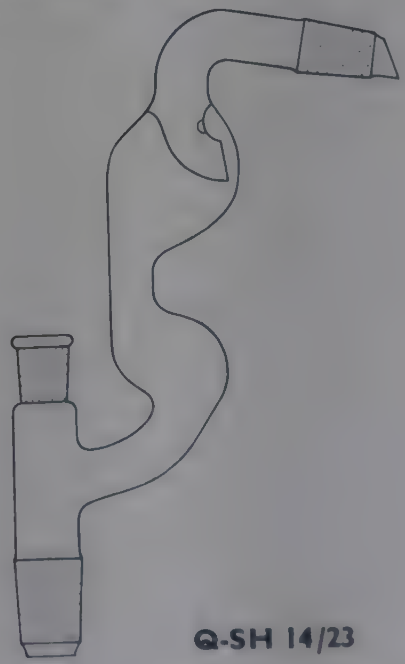
Q-SH 17/23

Q-KSH 7/63

Gallenkamp Stillheads with standard joint cones and sockets—see DT-540 et seq. in List No. sequence.

SPLASH HEADS

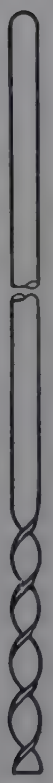
List No.	Description	Cone fitting flask or column	Cone fitting condenser	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-SH 14/23	Splash head, double bulb, sloping, with 14/23 socket ...	24/29	19/26	1	3·85	—
Q-SH 17/23	Splash head adapter	Socket 19/26	Cone 24/29	2	3·80	1·95



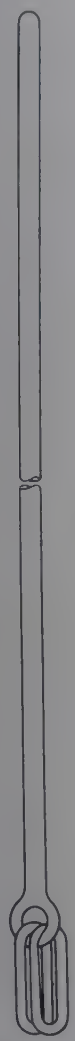
Q-SH 14/23

All items on this page are code *jx*.

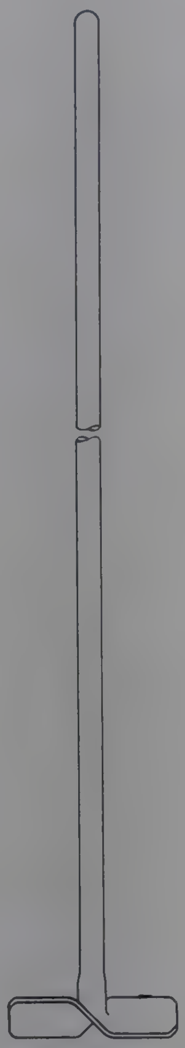
STIRRERS



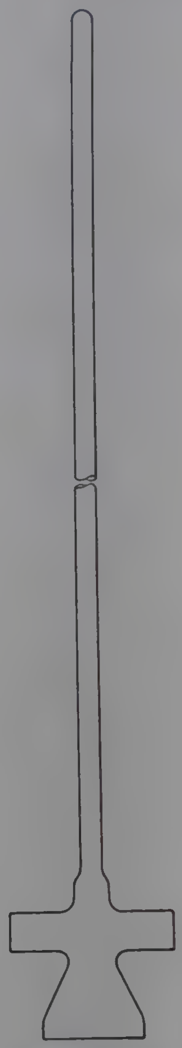
Q-ST 1/0



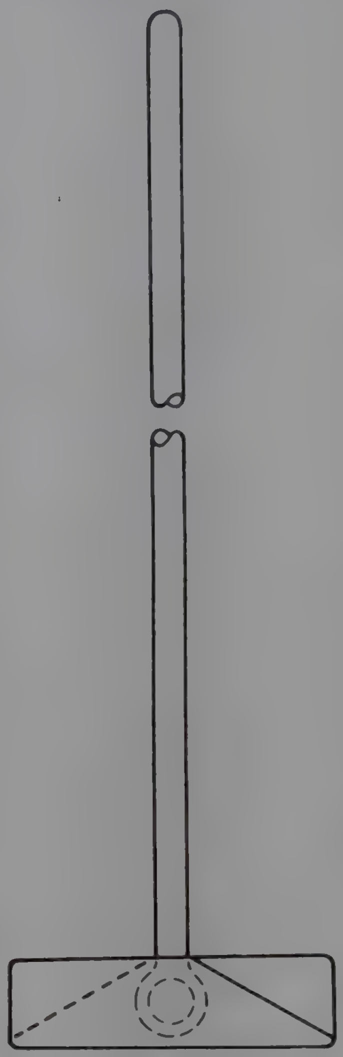
Q-ST 1/1
Q-ST 1/24



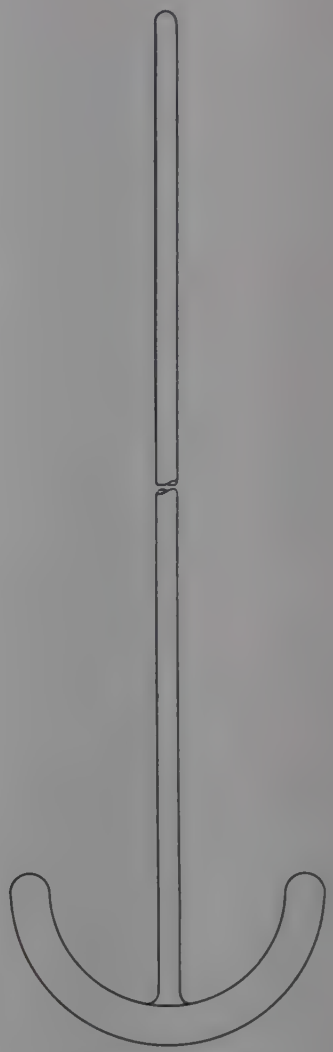
Q-ST 1/2
Q-ST 11/2



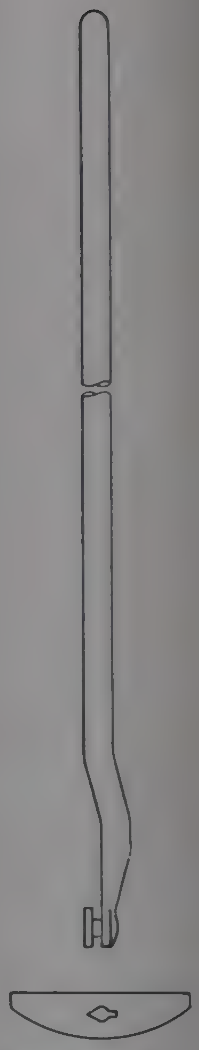
Q-ST 1/3
Q-ST 11/3



Q-ST 1/4



Q-ST 1/05
to
Q-ST 1/8



Q-ST 6/7
with
Q-ST 7/3

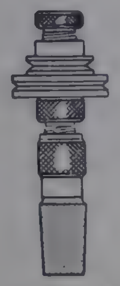
List No.	Description	Shaft Dia. mm	Shaft Length mm	Blade width (extended) mm	Minimum socket to pass	Std. pack qty.	Std. pack	Each
Quickfit							£	£
Q-ST 1/0	Screw type	5	210	—	10/19	1	**0·59**	—
Q-ST 1/1	Link	6	450	75	24/29	10	**7·00**	**0·78**
Q-ST 1/24	Link	6	600	75	24/29	2	**1·50**	**0·76**
Q-ST 1/4	Collapsible paddle	6	450	70	24/29	2	**2·80**	**1·45**
Q-ST 1/2	Fixed paddle	6	600	50	55/44	5	**4·55**	**0·98**
Q-ST 11/2	Fixed paddle	11	750	80	100 mm	1	**1·45**	—
Q-ST 1/3	Centrifugal	6	600	52	55/44	2	**3·10**	**1·60**
Q-ST 11/3	Centrifugal	11	750	92	100 mm	1	**1·90**	—
Q-ST 1/05	Anchor	5	210	45	50 mm	1	**0·65**	—
Q-ST 1/5	Anchor	6	450	95	100 mm	5	**5·00**	**1·08**
Q-ST 1/6	Anchor	6	600	140	100 mm	5	**5·00**	**1·08**
Q-ST 1/8	Anchor	11	750	140	100 mm	2	**2·80**	**1·45**
Q-ST 6/7	Shaft for Q-ST 7/2 and Q-ST 7/3	6	450	—	—	10	**9·70**	**1·10**
Q-ST 7/2	Detachable ptfe blade	—	—	52	19/26	5	**1·60**	**0·37**
Q-ST 7/3	Detachable ptfe blade	—	—	76	24/29	5	**2·95**	**0·64**
Q-ST 11/5	Shaft for Q-ST 7/3L	11	450	—	—	2	**2·90**	**1·50**
Q-ST 7/3L	Detachable ptfe blade	—	—	76	24/29	2	**1·40**	**0·72**

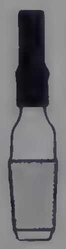
All items on this page are code *jx*.

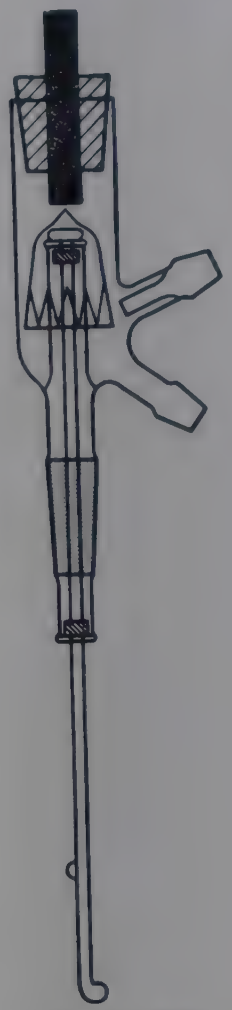
STIRRERS

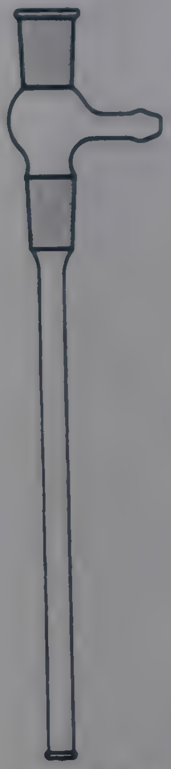
SEMI-MICRO STIRRER, TURBINE DRIVE, with glass shaft. The stirrer unit has a 10/19 cone suitable for fitting directly to a suitable test tube or semi-micro reaction flask. It can be driven by compressed air, water or vacuum whichever is the most convenient for the job in hand.

List No.	Shaft dia.	Shaft length	Std. pack qty.	Std. pack
Quickfit				£
Q-MU 8/0	2 mm	90 mm	1	5·85


Q-ST 4/2

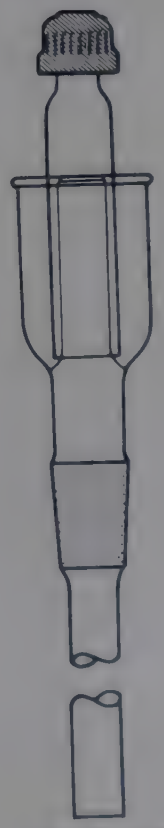

Q-ST 5/2

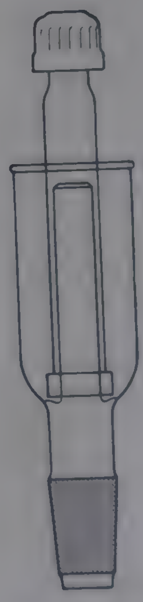

Q-MU 8/0


Q-ST 2/2

STIRRER GUIDES AND GLANDS

List No.	Description	Shaft dia. mm	Std. pack qty.	Std. pack	Each
				£	£
Quickfit					
Q-ST 2/2	Stirrer guide, 19/26 socket and cone ...	6	5	6·50	1·40
Q-ST 2/33C	Stirrer guide, 24/29 socket and cone ...	11	2	3·70	1·90
	Stirrer glands with stuffing box				
Q-ST 3/2F	Ptfe without pulley, 19/26 cone ...	6	2	9·10	4·70
Q-ST 4/2	Brass with pulley, 19/26 cone ...	6	1	4·00	—
Q-ST 4/2F	Ptfe with pulley, 19/26 cone... ...	6	2	11·40	5·90
Q-ST 4R	O-rings for Q-ST 4/2 and Q-ST 4/2F	6	10	0·40	—
Q-ST 4W	Felt washers for stuffing box ...	6	50	1·00	—
	Stirrer glands for rubber sleeve				
Q-ST 5/1	Cone 14/23	6	2	1·40	0·72
Q-ST 5/2	Cone 19/26	6	5	3·50	0·76
Q-ST 5/3	Cone 24/29	6	5	3·50	0·76
	Stirrer glands with mercury seal and guide and screw cap				
Q-ST 18/2	Thread size 13, cone 19/26	6	5	10·50	2·25
Q-ST 8/2T	Spare screw cap with ring and washer	6	2	1·62	0·84
	Stirrer glands with ground sleeve and screw cap				
Q-ST 20/2	Thread size 13, cone 19/26	6	5	16·50	3·60
Q-ST 20/3	Thread size 24, cone 24/29	11	2	8·90	4·60
Q-ST 20/4	Thread size 24, cone 29/32	11	2	9·00	4·60
Q-ST 10/2T	Spare ground sleeve screw cap with ring and washer	6	2	3·20	1·65
Q-ST 10/34T	Spare ground sleeve screw cap with ring and washer	11	1	2·05	—
Q-ST 10P	Drive pulley, 100 mm dia., for *Quickfit* stirrer glands	—	1	4·30	—
Clearfit					
Q-KST 2/2	Stirrer guide, 19/26 socket and cone ...	6	1	1·45	—
Q-KST 2/33/7	Stirrer guide, 24/29 socket and cone ...	6	1	1·75	—
Q-KST 2/44/7	Stirrer guide, 29/32 socket and cone ...	6	1	1·95	—
Q-KST 2/44C	Stirrer guide, 29/32 socket and cone ...	11	1	2·40	—
	Stirrer glands with screw cap				
Q-KST 20/2	Thread size 13, cone 19/26	6	1	3·40	—
Q-KST 20/3/6	Thread size 13, cone 24/29	6	1	3·45	—
Q-KST 20/4/6	Thread size 13, cone 29/32	6	1	3·45	—
Q-KST 20/3	Thread size 24, cone 24/29	11	1	4·55	—
Q-KST 20/4	Thread size 24, cone 29/32	11	1	4·60	—


Q-ST 18/2


Q-ST 20/2

All items on this page are code *jx*.

STOPPERS

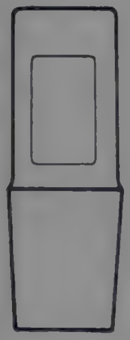
STOPPERS, closed ends.

List No.	Cone	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-SB 7	7/16	5	3·10	0·66
Q-SB 10	10/19	20	5·80	0·36
Q-SB 12	12/21	20	5·80	0·36
Q-SB 14	14/23	20	5·20	0·33
Q-SB 19	19/26	20	6·00	0·37
Q-SB 24	24/29	20	6·40	0·39
Q-SB 29	29/32	20	6·40	0·39
Q-SB 34	34/35	20	8·60	0·50
Q-SB 40	40/38	2	1·40	0·72
Clearfit				
Q-KSB 14	14/23	10	4·20	0·47
Q-KSB 19	19/26	10	4·80	0·53
Q-KSB 24	24/29	10	5·40	0·60
Q-KSB 29	29/32	5	2·70	0·57

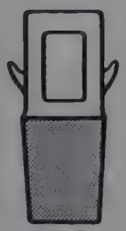
STOPPERS

Regd.

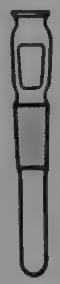
Borosilicate glass or polypropylene with standard cones—see SU-520 et seq. in List No. sequence.



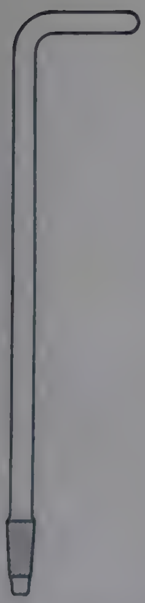
Q-KSB 19



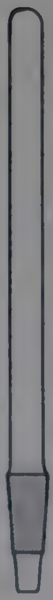
Q-SB 14H



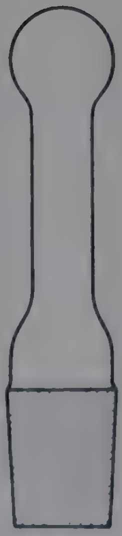
Q-SH 4A



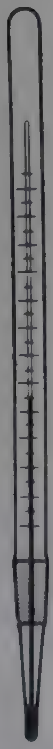
Q-D 62/0



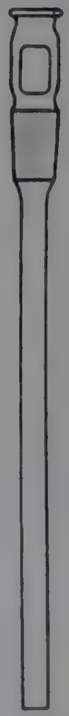
Q-FC 16B



Q-SIB 24



Q-MF 31/2



Q-MF 16/2

STOPPERS, closed ends with hooks.

List No.	Cone	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-SB 14H	14/23	10	4·00	0·45
Q-SB 19H	19/26	10	4·50	0·49

STOPPERS, long handle.

List No.	Cone	Purpose	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-D 62/0	10/19	Dropping funnel, bent ...		For price see entry on page 579	
Q-FC 16B	10/19	Dropping funnel, straight ...	5	2·00	0·44
Q-SIB 24	24/29	Iodine flask ...	5	3·75	0·82

THERMOMETER POCKET
To fit all standard stillheads.

List No.	Cone	Stem length mm	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-SH 4A	14/23	45	10	7·00	0·78

THERMOMETERS

List No.	Cone	Range	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MF 31/0/110	10/19	−10 to 110°C	2	6·90	3·60
Q-MF 31/0/250	10/19	0 to 250°C	5	18·00	3·90
Q-MF 31/0/360	10/19	0 to 360°C	2	7·70	4·00
Q-MF 31/1	14/23	−10 to 110°C	5	17·25	3·70
Q-MF 31/2	14/23	0 to 250°C	5	18·00	3·80
Q-MF 31/3	14/23	0 to 360°C	5	18·75	4·10
Q-MU 31/3	—	0 to 360°C	5	6·50	1·40

THERMOMETER POCKETS
Long type for sealing to length required.

List No.	Cone	Stem length mm	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MF 16/1	14/23	200	2	1·50	0·78
Q-MF 16/2	19/26	200	2	1·50	0·78

All items on this page are code *jx*.

TUBES

AIR LEAK OR GAS ENTRY TUBES, straight. Q-MU 9/00 has a 10/19 socket.

List No.	Cone	Stem length mm	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MU 9/00	10/19	—	2	1·94	1·00
Q-MF 15/0	10/19	100	10	7·00	0·78
Q-MF 15/1	14/23	150	20	13·00	0·76
Q-MF 15/2	19/26	150	10	7·00	0·78
Q-MF 15/3	24/29	150	5	4·05	0·88

TEST TUBES, without stopper.

List No.	Socket	Overall length mm	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MF 24/0	10/19	65	10	4·30	0·48
Q-MF 24/0/4	10/19	100	20	8·60	0·49
Q-MF 24/12/4	12/21	100	10	4·30	0·48
Q-MF 24/1	14/23	100	50	19·00	0·46
Q-MF 24/1/5	14/23	125	50	21·50	0·51
Q-MF 24/1/6	14/23	150	50	21·50	0·51
Q-MF 24/2	19/26	100	20	9·60	0·55
Q-MF 24/2/6	19/26	150	50	24·00	0·57
Q-MF 24/3	24/29	150	50	27·00	0·64
Q-MF 24/3/8	24/29	200	20	10·80	0·62
Q-MF 24/5	34/35	250	5	3·50	0·74
Clearfit					
Q-KMF 24/1	14/23	100	2	0·96	0·50
Q-KMF 24/1/5	14/23	125	1	0·54	—
Q-KMF 24/1/6	14/23	150	1	0·54	—
Q-KMF 24/2	19/26	100	1	0·54	—
Q-KMF 24/2/6	19/26	150	1	1·18	—
Q-KMF 24/3	24/29	150	2	1·18	0·60
Q-KMF 24/3/8	24/29	200	2	1·30	0·66

For suitable stoppers see Q-SB 10 et seq. on page 586.

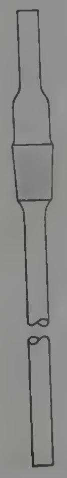
U-TUBES

List No.	Type	Socket or cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MF 21/2	2 Sockets	19/26	2	2·70	1·40
Q-MF 22/2	2 Cones	19/26	1	0·81	—

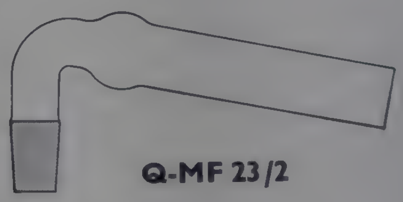
Ⓐ **Test tubes with standard joint sockets—see TF-410 et seq. in List No. sequence.**

DRYING TUBES, angled.

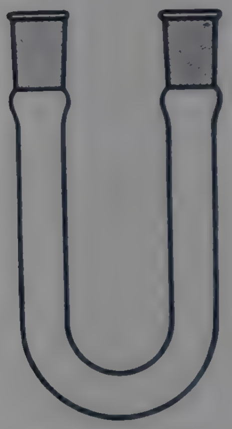
List No.	Cone	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-MF 23/0	10/19	2	1·62	0·84
Q-MF 23/1	14/23	5	4·30	0·92
Q-MF 23/2	19/26	10	9·70	1·10
Q-MF 23/3	24/29	5	5·50	1·20
Clearfit				
Q-KMF 23/2	19/26	1	1·10	—
Q-KMF 23/3	24/29	1	1·15	—



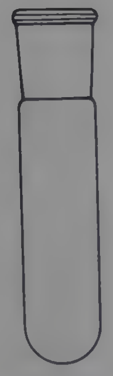
Q-MF 15/1



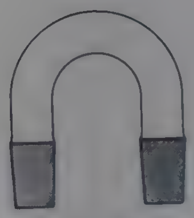
Q-MF 23/2



Q-KMF 21/2



Q-KMF 24/2



Q-MF 22/2

DOUBLE SPRING CLIPS, chromium plated steel double ended clips of which one end fits the normal 13 mm retort or scaffold rod The other end takes glassware of sizes as shown.

List No.	To hold tube size mm	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-MF 40/13/10	9–12	5	0·85	0·23
Q-MF 40/13/19	18–22	5	0·85	0·23
Q-MF 40/13/24	24–28	5	0·85	0·23

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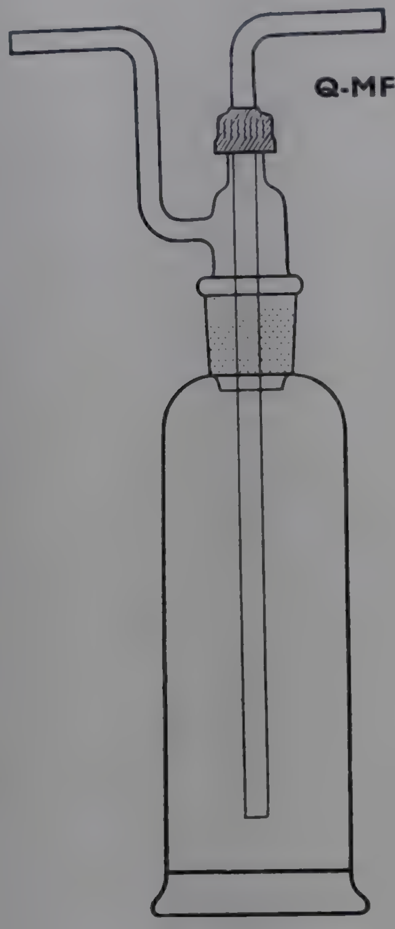
WASHBOTTLES



Q-MF 29/3/250

WASH BOTTLE HEADS for use with standard joint flasks.

List No.	Cone	For flasks	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MF 25/3	24/29	FE 500/3	2	2·40	1·25
Q-MF 25/3L	24/29	FF 1L/3M	2	2·40	1·25

WASH BOTTLE HEAD, DRECHSEL, adjustable
A screw thread joint allows easy adjustment of the dip tube so that the head can be used with various sizes of Drechsel bottle. Cone 24/29, thread size 13.

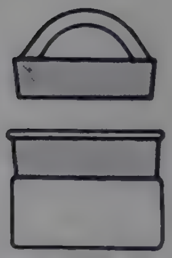
List No.	To fit bottles	Std. pack qty.	Std. pack	Each
Quickfit			£	£
Q-MF 27/3/13	Q-MF 29/3/125 Q-MF 29/3/250	5	8·75	1·90

GAS WASH HEADS and BOTTLES, DRECHSEL

List No.	Description	Cone	Std. pack qty.	Std. pack	Each
Quickfit				£	£
Q-MF 28/2	Head	19/26	2	2·60	1·35
Q-MF 28/3/125	Head	24/29	5	6·00	1·30
Q-MF 28/3/250	Head	24/29	10	13·50	1·65
Q-MF 28/3/500	Head	24/29	5	6·25	1·40
Q-MF 29/3/125	Bottle 125 ml	24/29	5	5·50	1·20
Q-MF 29/3/250	Bottle 250 ml	24/29	10	12·00	1·35
Q-MF 29/3/500	Bottle 500 ml	24/29	5	7·50	1·60

Ⓖ Drechsel bottles with plain or sintered distributor tubes see GAS WASHBOTTLES.

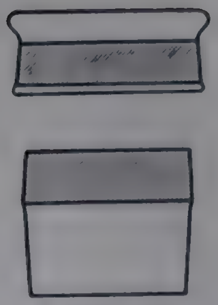
Q-WB 10
Q-WB 11



Q-WB 40
Q-WB 43

WEIGHING AND DROPPING BOTTLES

List No.	Description	Socket or cone	Maximum weight	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-WB 10	Weighing bottle lid	24/10	5 g	2	1·08	0·56
Q-WB 11	Weighing bottle base	24/10	15 ,,	2	1·30	0·68
Q-WB 40	Weighing bottle lid	40/13	10 ,,	5	3·25	0·70
Q-WB 43	Weighing bottle base	40/13	20 ,,	5	3·50	0·76
Q-WB 50L	Weighing bottle lid	50/14	25 ,,	5	4·30	0·92
Q-WB 50B	Weighing bottle base	50/14	30 ,,	5	3·75	0·82
			Capacity			
Q-MF 33A	Dropping bottle ...	—	25 ml	5	4·55	0·98
Q-MF 33B	Pipette	19/17	1·5 ml	5	6·00	1·30
Q-MF 33C	Rubber teat	—	—	10	0·30	—



Q-WB 50L
Q-WB-50B

Q-MF 33A/B/C

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QUICKFIT ASSEMBLIES

COLUMN CHROMATOGRAPHY

List No.	Description	Socket or cone	Std. pack qty.	Std. pack	Each
				£	£
Q-1 CR	**Assembly with 10 mm × 100 mm column**	—	1	13·25	—
	Components				
Q-CR 12/10	Column 10 mm × 100 mm with tap and sintered glass porosity 0 support plate ...	14/23 socket 19/26 cone	2	12·40	6·40
Q-CR 2/11	Reservoir, 50 ml ...	14/23	1	4·50	—
Q-CR 41/42	Tamping rod for Q-CR 12/10 and Q-CR 12/30	—	2	0·86	0·45
Q-FB 100/2	Buchner flask, 100 ml	19/26	—	For prices see entries on pages stated	Page 575
Q-MF 10/1B	Cone adapter... ...	14/23	—		563
JR-140	Spring, 38 mm ...	—	—		390
	Accessory			Std. pack	Each
				£	£
Q-CR 12/30	Column 10 mm × 300 mm with tap and sintered glass porosity 0 support plate ...	14/23 socket 19/26 cone	2	13·20	6·80

List No.	Description	qty.	Std. pack qty.	Std. pack	Each
				£	£
Q-2 CR	**Assembly with 18 mm × 200 mm column**	—	1	13·90	—
	Components				
Q-CR 32/20	Column 18 mm × 200 mm with sintered glass porosity 0 support plate... ...	—	2	5·10	2·65
Q-CR 43/53	Tamping rod for Q-CR 32/20, 30 and 40	—	2	1·50	0·78
Q-CR 3T/23	Tap adapter	19/26 socket 24/29 cone	—	For prices see entries on pages stated	Page 563
Q-DA 23	Reduction adapter ...		—		556
Q-D 3/32	Reservoir, 250 ml ...	—	—		578
Q-FB 250/3	,, 250 ml	24/29	—		575
				Std. pack	Each
	Accessories			£	£
Q-CR 32/30	Column 18 mm × 300 mm with sintered glass porosity 0 support plate... ...	19/26 cone 24/29 socket	2	5·30	2·75
Q-CR 32/40	Ditto but 18 mm × 400 mm		2	5·90	3·10

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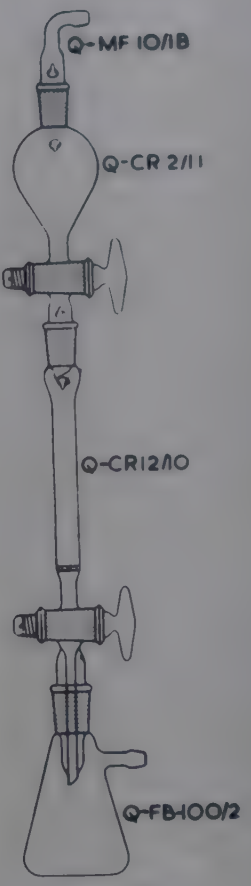
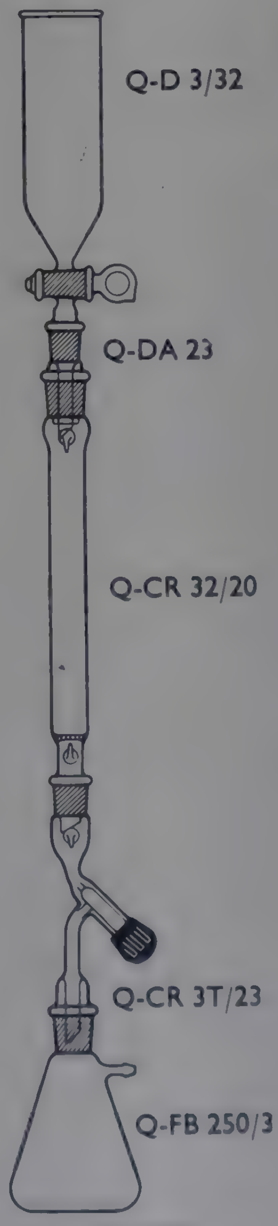
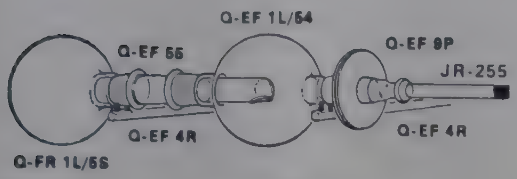


Q-1CR
(Also includes Q-CR 41/42 and 4×JR-140, 38 mm)



Q-2CR
(Also includes Q-CR 43/53)

QUICKFIT ASSEMBLIES

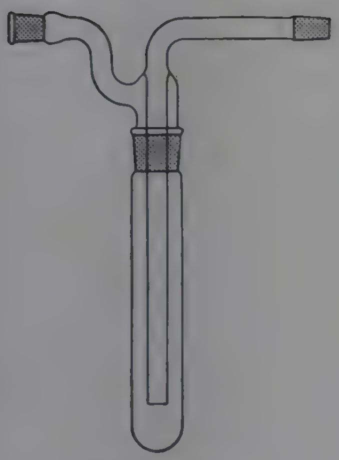


Q-ILVE

ROTARY FILM EVAPORATOR

List No.	Description	Socket/ Cup	Cone/ Ball	Std. pack qty.	Std. pack
Quickfit **Q-ILVE**	**Assembly**	—	—	1	£ **9·25**
	Components				
Q-EF 55	Double cone adapter ...	—	34/35	1	**2·20**
Q-EF IL/54	Receiver flask, 1 litre ...	34/35	24/29, S 19	1	**3·45**
Q-EF 9P	Pulley wheel	—	—	1	**0·80**
Q-EF 4R	2× Rollers ...	—	—	1	**1·00**
					Page
Q-FR IL/5S	Boiling flask, 1 litre ...	34/35	—	For prices see entries on pages stated	569
JR-255	Vacuum tube	FS19	—		390

Q-MF 28/52

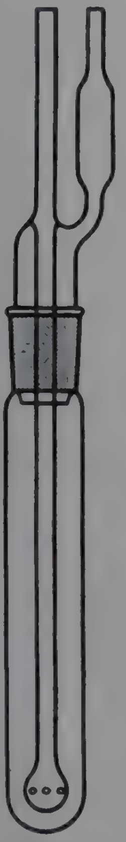


Q-MF 24/5

COLD TRAP

For vacuum systems. May also be used as a Kjeldahl absorption trap.

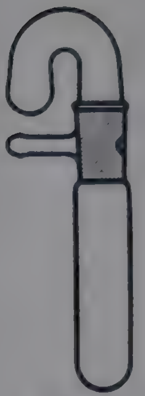
List No.	Description	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit **Q-MF 24/5**	Trap body 250 mm ...	34/35	—	—	£ For price see entry on page 587	£
Q-MF 28/52	Trap head...	19/26	34/35 and 19/26	2	**6·30**	**3·30**



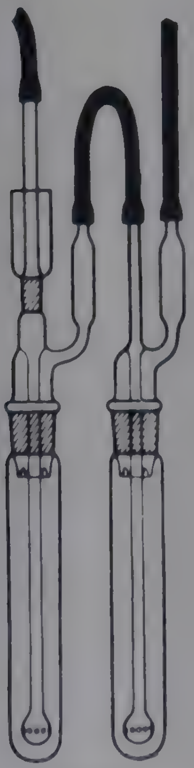
Q-BC 11
Q-MF 24/3/8

THUNBERG TUBES

List No.	Description	Approx. capacity ml	Socket or cone	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-BC 31/1	Thunberg stopper	2	14/23	5	**4·25**	**0·92**
Q-BC 32/1	Thunberg tube	6	14/23	5	**6·50**	**1·40**
Q-BC 31	Thunberg stopper	2	19/26	5	**4·25**	**0·92**
Q-BC 32	Thunberg tube	20	19/26	5	**6·50**	**1·40**



Q-BC 31
Q-BC 32



Q-11MC

LEURQUIN APPARATUS, for micro determination of nitrogen in blood, serum, urine, etc.

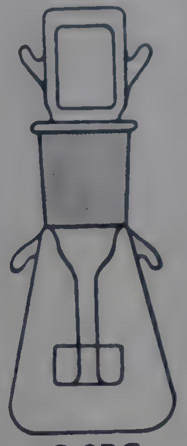
List No.	Description	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit **Q-11MC**	**Alkalisation assembly**	—	—	1	£ **6·65**	£ —
	Components					
Q-BC 11	Absorption head	—	24/29	5	**8·00**	**1·75**
Q-MF 24/3/8	Test tube capacity approx. 70 ml	24/29	—	—	For price see entry on page 587	
JR-010	Cone (CNB 10)	See entry in List No. sequence.				
Q-MC 11P	Aeration head	10/19	24/29	1	**3·75**	—

All items on this page are code *jx.*

QUICKFIT ASSEMBLIES

CAVETT BLOOD TEST APPARATUS, for determination of alcohol in blood

List No.	Description	Std. pack qty.	Std. pack	Each
Quickfit **Q-2BC**	**Assembly**	1	£ 2·05	£ —
Q-BC 3CH	Components Special 24/29 stopper with hooks and cup	5	6·00	1·30
Q-BC 50/3H	Conical flask, 50 ml, 24/29 joint with hooks	5	4·25	0·92
JR-140	2 × Stainless steel springs 38mm	For price see entry in List No. sequence.		


Q-2BC

DILATOMETER
For measuring the expansion of edible oils and fats over the temperature range during which melting takes place.

List No.	Description	Std. pack qty.	Std. pack	Each
Quickfit **Q-WE 12/1**	Dilatometer body, socket 14/23 ...	2	£ 8·00	£ 4·10
Q-SB 14DL	Stopper portion, cone 14/23 ...	2	1·22	0·64

Q-WE 12/1
Q-SB 14DL

HOMOGENISER
This homogeniser is suitable for breaking down tissues in small scale work.

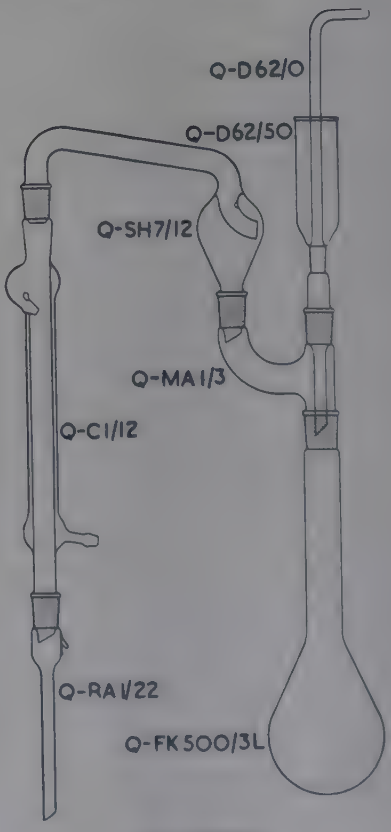
List No.	Description	Std. pack qty.	Std. pack	Each
Quickfit **Q-BC 15P**	Plunger, dia. 15 mm	5	£ 7·25	£ 1·55
Q-BC 15/150	Tube, dia. 15 mm, length 150 mm...	5	3·00	0·64

Q-BC 15P
Q-BC 15/150

NITROGEN DETERMINATION

MACRO KJELDAHL DISTILLATION UNIT
This assembly uses the same flask for distillation as for the digestion stage and conversion from one stage to the other can be done very quickly. All the distillation apparatus except for the flask is carried on one straight rod by means of special spring clips, and can easily be moved into position merely by adjusting one bosshead.

List No.	Description	Socket	Cone	Std. pack qty.	Std. pack
Quickfit **Q-280 MC**	**Assembly**	—	—	1	£ 9·85
	Components				Page
Q-C 1/12	Condenser, 200 mm jacket length	19/26	19/26	For prices see entries on pages stated	564
Q-D 62/50	Plug dropping funnel 50 ml	10/19	19/26		579
Q-FK 500/3L	Kjeldahl flask, 500 ml	24/29	—		574
Q-MA 1/3	Multiple adapter	19/26	24/29		557
Q-MF 40/13/24	2× Double spring clips	—	—		587
Q-D 62/0	Funnel plug	—	10/19		579
Q-RA 1/22	Delivery adapter	19/26	—		559
Q-SH 7/12	Splash head	19/26	19/26		583



Q-280MC

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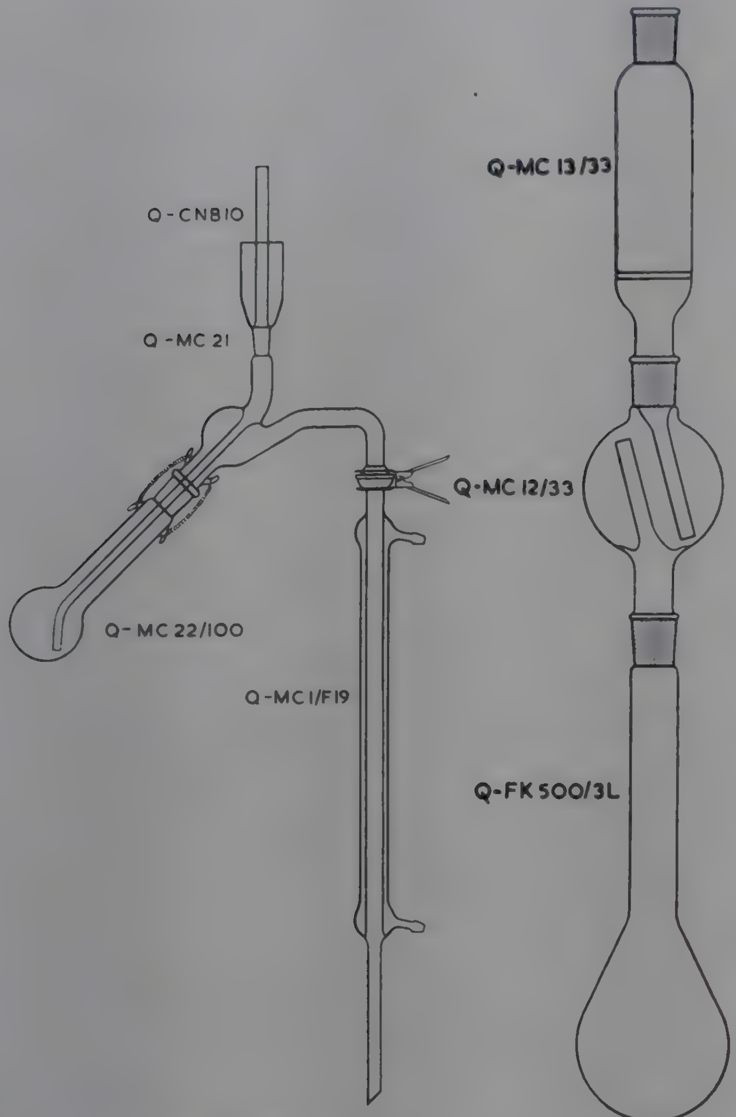
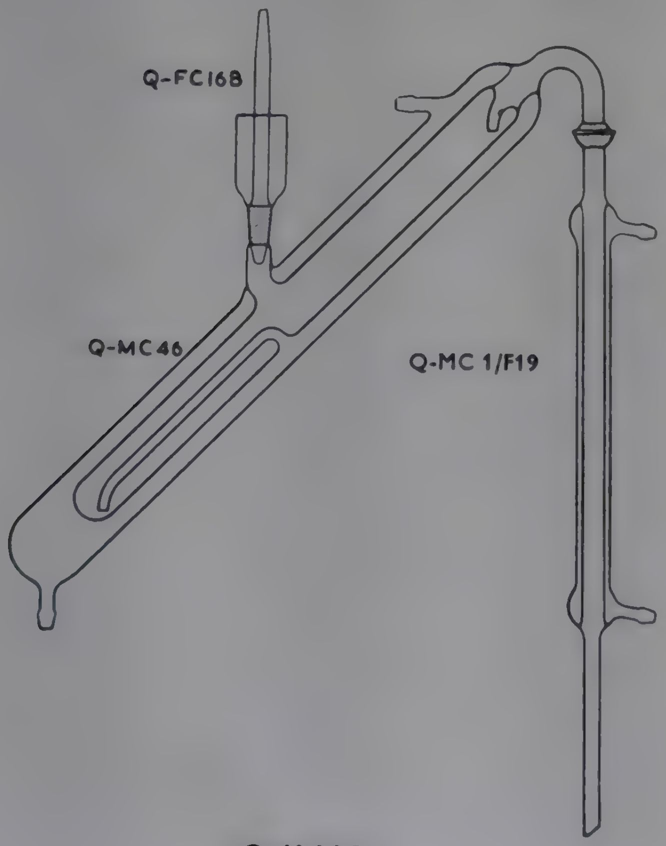


Q-21/100 MC

Ⓐ Kjeldahl apparatus for macro and micro determination of nitrogen see **NITROGEN DETERMINATION.**



Q-46 MC

NITROGEN DETERMINATION

SEMI MICRO KJELDAHL APPARATUS

List No.	Description	Socket or cup	Cone or ball	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-21/50 MC	**Assembly 50 ml** ...	—	—	1	8·30	—
Q-21/100 MC	**Assembly 100 ml** ...	—	—	1	8·40	—
	Components					
Q-MC 1/F19	Liebig condenser, 280 mm effective length	S19	—	2	4·10	2·10
Q-MC 21	Distillation head ...	10/19	19/26 and S19	2	9·50	4·90
Q-MC 22/50	Kjeldahl flask, 50 ml	19/26	—	5	4·30	0·92
Q-MC 22/100	Kjeldahl flask, 100 ml	19/26	—	5	4·55	0·98
JR-010	Funnel plug(CNB 10)	—	10/19		For prices see entries in List No. sequence.	
JR-140	Stainless steel spring 38 mm	—	—			
JR-260	Spherical joint clip JC19	—	—			

ABSORPTION TRAPS

Suitable for absorbing sulphur dioxide in Kjeldahl determinations or hydrogen chloride in Friedel-Crafts reactions without the use of a fume cupboard.

List No.	Description	Socket	Cone	Std. pack qty.	Std. pack	Each
Quickfit					£	£
Q-MC 12/33	Lower chamber, 250 ml	24/29	24/29	2	5·60	2·90
Q-MC 13/33	Upper chamber ...	24/29	24/29	1	3·20	—

MARKHAM STILL, for micro-Kjeldahl determination. To BS 1428 Part B2.

List No.	Description	Socket or cup	Cone or ball	Std. pack qty.	Std. pack
Quickfit					£
Q-46 MC	**Assembly**	—	—	1	12·90
	Components				
Q-MC 46	Markham still body with steam trap jacket 25 ml ...	10/19	S19	1	10·10
Q-FC 16B	Funnel plug ...	—	10/19	For price see entry on page 586.	
Q-MC 1F/19	Liebig condenser ...	S19	—	For price see entry above.	
JR-260	Spherical joint clip JC 19	—	—	For price see entry in List No. sequence.	

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RAIN GAUGE

RB-820

RAIN GAUGE, Symon, 5 in diameter. Comprises copper funnel with brass rim and stem, copper container and inner collecting can with lip. Includes 0·5 inch rainfall glass measure subdivided 0·01 in ... Each **£12·20** *cx*

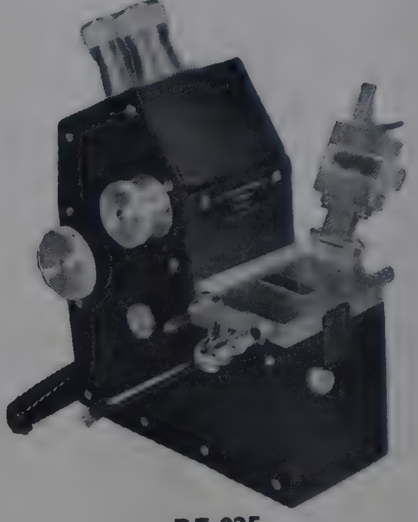
REFRACTOMETERS

RF-025

REFRACTOMETER, Abbé, B & S, for the examination of oils, fats, optical glass, sugar solutions, etc. The refractive index of substances between 1·300 and 1·700 is read directly to 0·001 and can be estimated to 0·0002 from the enclosed glass scale. An additional engraved glass scale, calibrated 0 to 95% sugar with subdivisions of 0·5%, is provided for estimation of soluble solids in sugar solutions and fruit pulp, etc. A sample of approximately 0·5 ml is required. With protected thermometer, horizontal prism surface, water jackets and dust cover. For illumination by transmitted or reflected artificial light. With scale illuminator comprising 4V bulb transformer, on/off switch and mains connector.

For 220/240V a.c. single phase supplies... Each **£225·00** *fx*
For 110/120V a.c. single phase supplies... Each **£225·00** *fxN*

REPLACEMENT PART
RF-030 **Thermometer,** scale span 0 to 75°C ... Each **£2·00** *fx*



RF-025

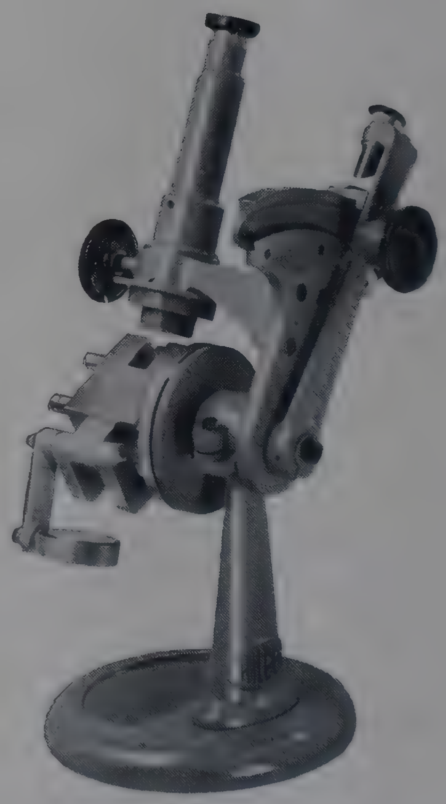
RF-060

REFRACTOMETER, Abbé, *B & S,* **high accuracy,** as RF-020 but with linear scale and micrometer screw enabling refractive indices to be found with an accuracy of 0·00004 using the tables provided. For use with sodium light to eliminate border line colour. With protected thermometer, horizontal prism surface, water jackets, scale illuminator and dust cover.

For 220/240V a.c. single phase supplies... Each **£285·00** *fx*
For 110/120V a.c. single phase supplies... Each **£285·00** *fxN*

REPLACEMENT PART
RF-030 **Thermometer.** For price see entry in List No. sequence.

ACCESSORY FOR ABBÉ REFRACTOMETER RF-060
LH-400 **Sodium lamp,** *Gallenkamp.* For details and price see entry in List No. sequence.



RF-080

RF-080

REFRACTOMETER, Abbé, *Hilger,* for measurement of the refractive index of liquids. Refractive index range 1·3 to 1·7 reading direct to 0·001 and estimated to 0·0002 using approx. 0·5 ml. of sample. With water jacketed prisms. For use with transmitted or reflected artificial or natural light. In case ... Each **£295·00** *fxN*

RF-140

REFRACTOMETERS, pocket, for measurement of percentage sugar in solutions and solids. With conversion tables for refractive index readings. In case.

Sugar scale	0–28	0–50	40–85%	
Subdivision	0·5	1	1%	
Each	**£27·00**	**22·00**	**26·00**	*fx*

RF-140

REFRIGERATED PROBES

- **Suitable for air or liquid cooling**
- **Flexible connection to cooling coil**
- **Available in three sizes**

Comprises a sealed compressor mounted in a ventilated stove enamelled case and coupled by flexible armoured hose to the evaporator coil. In use it is recommended that the refrigerated probe be left running continuously and that thermostatic control of the bath or air-space be effected by means of a heater and thermostat combination.

RJ-456
RJ-458

Technical Data

	RJ-450	RJ-456	RJ-458	
Overall dimensions (excluding flexible hose)	46×30×26	51×33×28	64×34×31	cm
Evaporator coils	18×18×2·5	21×21×6·5	21×21×6·5	cm
Type of coil	flat, vertical	triple helix	triple helix	
Weight	2	3	4·5	kg
Power consumption	210	260	400	W

RJ-450

REFRIGERATED PROBE ASSEMBLY, *T & M*, as specification, suitable for maintaining a 35 to 50 litre capacity thermostatted bath at **5 to 10degC below ambient.** For 220/240V 50 Hz single phase supplies.
Each **£82·80** *fxN*

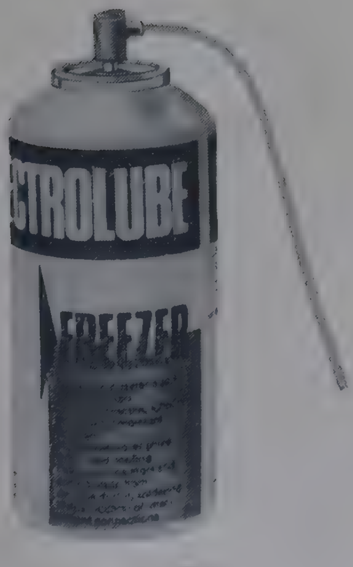
RJ-456

REFRIGERATED PROBE ASSEMBLY, *T & M*, as specification, suitable for maintaining a 35 to 50 litre capacity thermostatted bath at **20 to 30degC below ambient.** For 220/240V 50 Hz single phase supplies.
Each **£120·00** *fxN*

RJ-458

REFRIGERATED PROBE ASSEMBLY, *T & M*, as specification, suitable for maintaining a 35 to 50 litre capacity thermostatted bath at **40 to 50degC below ambient.** For 220/240V 50 Hz single phase supplies.
Each **£160·00** *fxN*

FREEZER



RJ-550

RJ-550

FREEZER AEROSOL, *Electrolube*, for rapidly cooling small objects and specimens down to −50°C. The spray material is non-toxic and non-inflammable and contains water repellent lubricant which first applies a thin protective film. Numerous laboratory applications include the cooling of melting point blocks and calorimeter bombs, rejoining mercury threads in thermometers, freezing of microtome knives and specimens, chilling of metallurgical samples, freezing of biological specimens for dissection, shrinking piece parts and cooling electronic and other components before, during and after soldering. In aerosol can containing approx. 340 g ... Each **£0·68** *mx*

GENERAL PURPOSE REFRIGERATORS

A range of front loading cabinets with magnetic door catches and hermetically sealed compressors. **For use in ambient temperatures up to 35°C.**

All capacities and dimensions given below are approximate.

RJ-810

REFRIGERATOR, *Lec*, **capacity 115 litres (4 ft³),** total shelf area 0·6 m² (7 ft²). With adjustable thermostat, manual defrost, automatic interior lighting, and 2 shelves. Overall dimensions 85H × 50W × 51D cm.

For 220/240V 50 Hz supplies	Each	**£38·67** *fxN*
For 110/120V 60 Hz supplies	Each	**£38·67** *fxN*

RJ-815

REFRIGERATOR, *Lec*, **capacity 140 litres (5 ft³),** total shelf area 0·9 m² (9 ft²). With adjustable thermostat, push button defrost, automatic interior lighting and 2 shelves. Overall dimensions 90H × 50W × 60D cm.

For 220/240V 50 Hz supplies	Each	**£42·00** *fxN*
For 110/120V 60 Hz supplies	Each	**£42·00** *fxN*

RJ-820

REFRIGERATOR, *Lec*, **capacity 210 litres (7 ft³),** total shelf area 1 m² (10 ft²). With adjustable thermostat, push button defrost, automatic interior lighting and 3 shelves. Overall dimensions 120H × 50W × 60D cm.

For 220/240V 50 Hz supplies	Each	**£52·00** *fxN*
For 110/120V 60 Hz supplies	Each	**£52·00** *fxN*

RJ-826

REFRIGERATOR, *Lec*, **capacity 450 litres (16 ft³),** total shelf area 1·7 m² (18 ft²). With adjustable thermostat, automatic interior lighting and 5 shelves. Overall dimensions 185H × 76W × 71D cm.

For 220/240V 50 Hz supplies	Each	**£153·00** *fxN*
For 110/120V 60 Hz supplies	Each	**£153·00** *fxN*

When ordering refrigerators please state voltage and frequency of supply.

Refrigerator for under bench fixing see FX-530 in List No. sequence.

ICE MAKING MACHINES see IC-255 to IC-282 in List No. sequence.

RJ-810
RJ-815

RJ-820

RJ-826

RJ-890

RJ-920
(RJ-940 is similar)

RJ-925

UPRIGHT FREEZER

For storage of frozen materials at temperatures in the region of −18°C in ambient temperatures up to 30°C.

RJ-890

REFRIGERATOR, upright freezer, *Sadia*, **350 litres capacity.** With white finished galvanised steel interior, ⅕ hp hermetically sealed compressor, fan convection for even temperature distribution, door operated fan cut-out switch to reduce loss of cold air when door opened, automatic defrost, interior thermostat, eleven shelf positions and three polythene coated grid shelves. Minimum temperature −18°C.

Overall dimensions 74 × 66 × 180 cm high.
Internal dimensions 62 × 42 × 120 cm high.
For 220/240V 50 Hz single phase supplies.
Each **£203·00** *fxN*

CONSERVATORS

For storage of frozen materials at temperatures in the region of −20°C in ambient temperatures up to 30°C.

RJ-920

REFRIGERATOR, Conservator, *Lec*, **115 litres capacity,** with aluminium storage compartment and ¼ hp hermetically sealed compressor. The thermostat is adjustable over the range −23°C to −12°C.

Overall dimensions 55 × 55 × 100 cm high.
Internal dimensions 43 × 43 × 60 cm deep.
For 215/240V 50 Hz supplies ... ... Each **£57·50** *fxN*

RJ-925

REFRIGERATOR, Conservator, *Lec*, **245 litres capacity,** with galvanised sheet steel storage compartment and ⅙ hp hermetically sealed compressor. The thermostat controls the storage temperature between −18°C and −20°C.

Overall dimensions 63 × 97 × 88 cm high.
Internal dimensions 47 × 80 × 73 cm deep.
For 220/250V 50 Hz supplies ... ... Each **£88·00** *fxN*

When ordering please state voltage and frequency of supply.

LOW TEMPERATURE CABINET

For operation at temperatures down to −40°C in ambient temperatures up to 30°C.

RJ-940

REFRIGERATOR, low temperature cabinet, *Lec*, **115 litres capacity,** with aluminium storage compartment, ¼ hp hermetically sealed compressor and plug lid. Includes an indicating thermostat adjustable over the range 0 to −40°C.

Overall dimensions 55 × 55 × 100 cm high.
Internal dimensions 43 × 43 × 60 cm deep.
For 215/240V 50 Hz supplies ... ... Each **£229·00** *mxN*

When ordering please state voltage and frequency of supply.

REFRIGERATED INCUBATORS, *Gallenkamp*, **temperature range 0 to 45°C**—see IH-275 et seq. in List No. sequence.

REFRIGERATED WATER BATHS, *Gallenkamp*, **temperature range −20 to +50°C**—see WF-720 et seq. in List No. sequence.

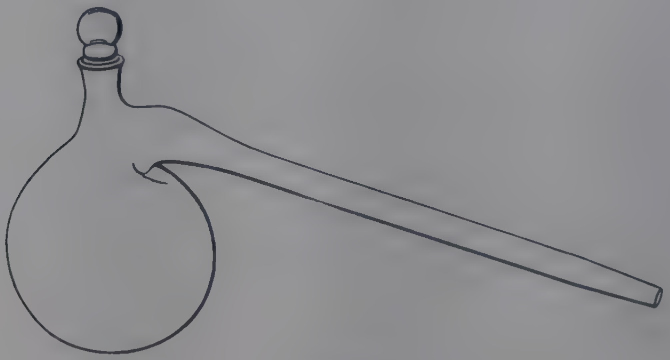
RETORTS

RP-020

RETORTS, *Pyrex* glass, **with stopper.**

Nominal capacity	100	250	500 ml	
Std. pack qty.	4	12	4	
Std. pack	£6·70	23·75	9·10	*jx*
Each	£1·80	2·20	2·45	

RETORT BASES and RODS see SM-430 et seq. in List No. sequence.



RP-020

GLASS RODS

For a summary of the properties of soda-lime and borosilicate glasses see data under page heading TUBING.

RT-020

RODS, soda-lime glass. In standard lengths of approx. 150 cm. The figures in pack qty. column indicate the approximate number of 150 cm lengths in a pack.

Diameter		Pack qty.	10 packs	Pack	
Nominal mm	Tolerance ±mm				
			£	£	
2·5	0·5	57	8·60	0·95	*mx*
4	0·5	30	8·60	0·95	*mx*
5	0·5	17	8·60	0·95	*mx*
6	0·5	15	8·60	0·95	*mx*
8	0·5	9	8·60	0·95	*mx*
10	0·5	5	8·60	0·95	*mx*

RT-030

RODS, *Pyrex* **borosilicate glass,** in standard lengths of approx. 150 cm. The figures in pack qty. columns indicate the approximate number of 150 cm lengths in a standard pack and shelf pack respectively.

Diameter		Std. pack qty.	Std. pack	Shelf pack qty.	Shelf pack	
Nominal mm	Tolerance ±mm					
			£		£	
3·5	0·4	245	16·65	11	0·95	*jx*
4·5	0·4	145	15·65	6	0·95	*jx*
5·5	0·4	155	13·85	8	0·95	*jx*
7	0·8	95	13·30	5	0·95	*jx*
9	0·8	55	12·85	3	0·95	*jx*
11	0·8	35	8·20	3	0·95	*jx*
13	0·8	25	8·20	2	0·95	*jx*

PLASTICS RODS

RT-080

RODS, ptfe, natural colour.

Dia. approx.	6	12 mm	
Per metre	£0·80	2·60	*cx*

PP-792

ROD, polythene, 3 mm dia. For details and price see entry in List No. sequence.

STIRRING RODS

RT-200

RODS, STIRRING, soda-lime glass, 20 cm long, 7 mm dia. with fused ends. In pack of 10.

10 packs **£2·40** Pack **£0·31** *ax*

RUBBER POLICEMEN for stirring rods—see RV-180 in List No. sequence.

SPATULA, polythene covered, suitable for use as a stirrer—see SJ-155 in List No. sequence.

RUBBER AND PLASTICS SUNDRIES

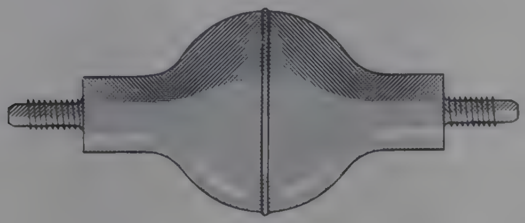
(All dimensions and capacities are nominal)

See also entries under page heading Plastics Sundries

RV-010

RUBBER BANDS, width 6 mm, in boxes of approximately 150.

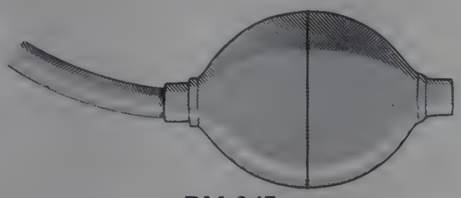
Length	50	75 mm	
10 boxes	**£3·60**	**3·60**	cx
Box	**£0·42**	**0·42**	



RV-030

RV-030

BELLOWS, PVC, with screwed inlet and outlet valves and nozzles for rubber tubing connection. Bulb diameter 53 mm ... ... Ten **£6·80** Each **£0·76** cx

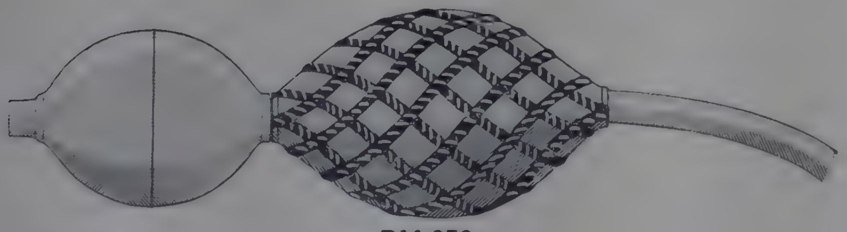


RV-045

RV-045

BLOWBALL, PVC, with inlet and outlet valves and short length of 5 mm internal diameter tubing connected to outlet. Bulb diameter 53 mm.

Ten **£3·70** Each **£0·43** cx

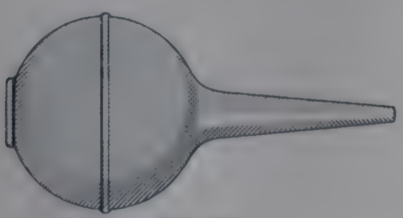


RV-050

RV-050

BLOWBALLS, PVC, with inlet and outlet valves, air reservoir protected by an expansion limiting net, and a short length of tubing connected to outlet.

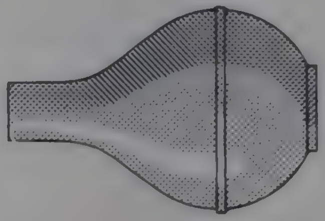
Bulb diameter	40	50	60 mm	
Reservoir diameter (inflated)	65	75	100 mm	
Ten	**£8·40**	**8·60**	**10·20**	cx
Each	**£0·94**	**0·96**	**1·14**	



RV-060

RV-060

BLOWBALL, PVC, pear shape, suitable for removing dust from balance mechanisms and lenses, etc. Bulb diameter 53 mm approx.... Ten **£2·50** Each **£0·31** cx

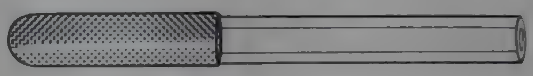


RV-080

RV-080

BULBS, PVC, pear shape, for use with pipettes, etc. Neck bore 4 mm.

Bulb diameter	32	36	40	48 mm	
For pipettes capacity	10	15	25	40 ml	
Ten	**£1·30**	**1·30**	**1·50**	**1·95**	cx
Each	**£0·20**	**0·20**	**0·22**	**0·26**	



RV-180 on tube

RV-180

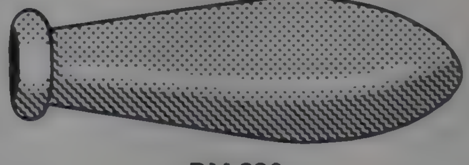
POLICEMEN, rubber tubes, approx. 40 mm long, closed at one end for stirring rods, etc., and for temporary closures when glassblowing. In packs of 50.

Internal diameter	3	4·5	6	8	10 mm	
10 packs	**£7·80**	**8·80**	**11·40**	**12·00**	**12·80**	cx
Pack	**£0·86**	**0·98**	**1·30**	**1·35**	**1·45**	

RV-181

POLICEMEN. Pack containing 10 each sizes 3, 4·5, 6, 8 and 10 mm RV-180.

Ten packs **£10·60** Pack **£1·18** cx



RV-220

RV-220

TEATS, latex rubber, for dropping pipettes. The 0·8 ml capacity is suitable for use with Dreyer pipette ME-380. In packs of 50.

Capacity	0·8	1·5	2·0	2·5	4·5 ml	
Neck bore	4	4·5	5	6·5	8 mm	
10 packs	**£9·00**	**9·00**	**9·60**	**11·00**	**12·20**	cx
Pack	**£1·00**	**1·00**	**1·06**	**1·25**	**1·35**	

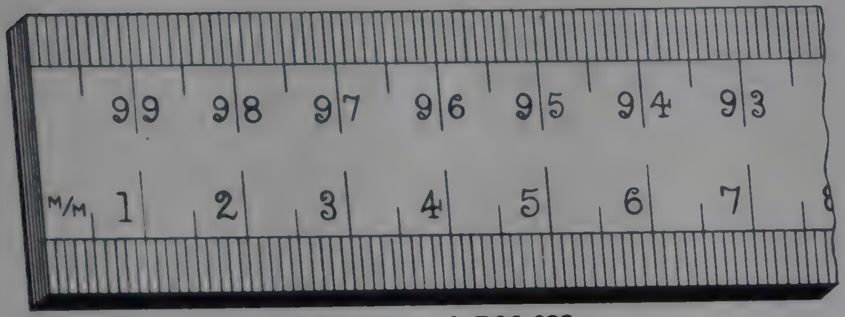
RV-221

TEATS. Pack containing 10 each sizes 0·8, 1·5, 2·0, 2·5 and 4·5 ml RV-220.

Ten packs **£12·00** Pack **£1·35** cx

RUBBER, adapters for Gooch crucibles	see CRUCIBLE ACCESSORIES
RUBBER, bungs	see STOPPERS, rubber
„ , gloves	see CLOTHING, protective
„ , tubing	see TUBING

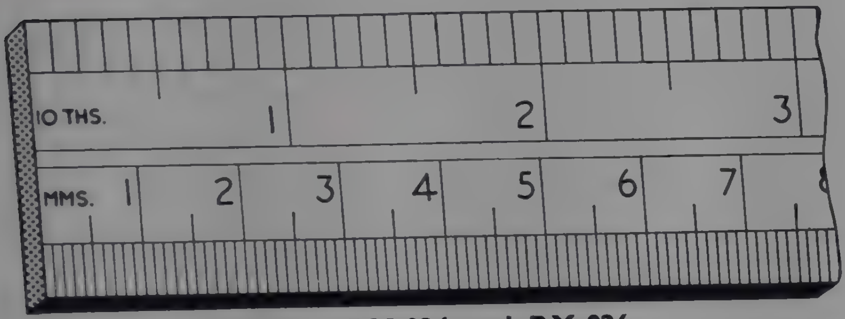
RULES


99
98
97
96
95
94
93
M/M
1
2
3
4
5
6
7
8

RX-021 and RX-022

RX-021
RULE, maple, horizontal reading, length 1 metre, width 25 mm, thickness 5 mm. Subdivided cm and mm on both edges ... ... Ten **£6·00** Each **£0·66** *cx*

RX-022
RULE, as RX-021 but **boxwood** ... Each **£0·88** *fx*

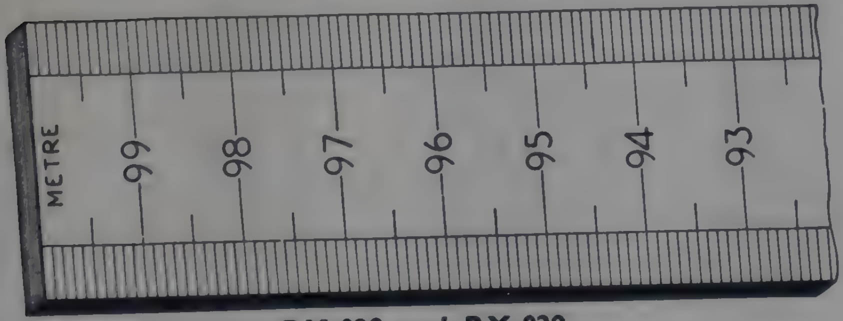

10 THS.
1
2
3
MMS.
1
2
3
4
5
6
7
8

RX-023, RX-024 and RX-026

RX-023
RULE, maple, horizontal reading, length 1 metre, width 25 mm, thickness 5 mm. Subdivided cm and mm one edge; inch and $\frac{1}{10}$ on other edge.
Ten **£6·00** Each **£0·66** *cx*

RX-024
RULE, as RX-023 but **boxwood** ... Each **£0·79** *fx*

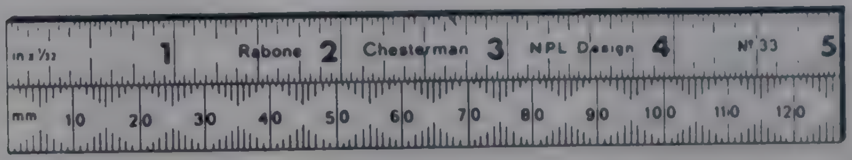
RX-026
RULE, maple, horizontal reading as RX-023 but length 0·5 metre ... ... Ten **£3·00** Each **£0·36** *cx*


METRE
99
98
97
96
95
94
93

RX-028 and RX-029

RX-028
RULE, maple, vertical reading, length 1 metre, width 25 mm, thickness 5 mm. Subdivided mm and cm on both edges ... ... Ten **£6·20** Each **£0·70** *cx*

RX-029
RULE, vertical reading as RX-028 but **boxwood.**
Each **£0·88** *fx*


in x 1/32
1
Rabone
2
Chesterman
3
NPL Design
4
No 33
5
mm
10
20
30
40
50
60
70
80
90
100
110
120

RX-055

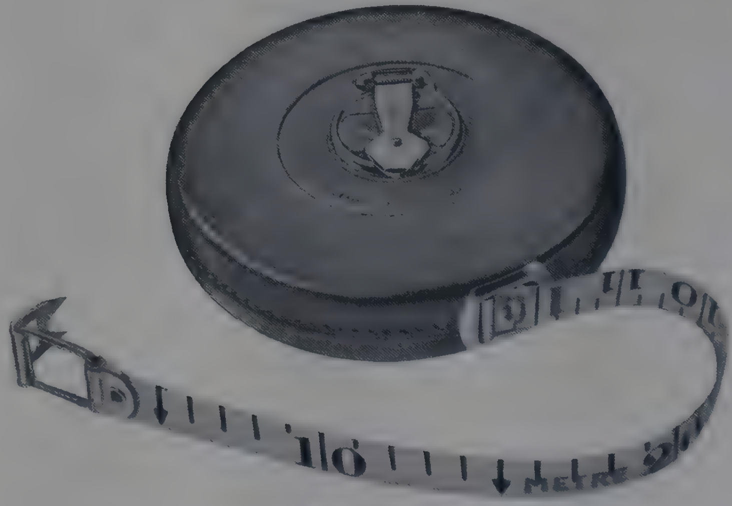
RX-055
RULES, steel, NPL design, subdivided $\frac{1}{20}$ in/mm and $\frac{1}{32}$ in/mm for measurement and conversion.

Length	5	10 in	
Each	**£0·75**	**1·25**	*fx*

Rabone
Chesterman
INTERFLEX
315
3m
+50mm

RX-060

RX-060
RULE, spring flex, concave-convex, length 2 metres, width 12 mm, in steel case with sliding stop for inside, 'end-on' and 'hook-over' measurements. Subdivided m, cm and mm; inch, $\frac{1}{16}$ in and $\frac{1}{32}$ in for first two inches.
Each **£0·64** *fx*



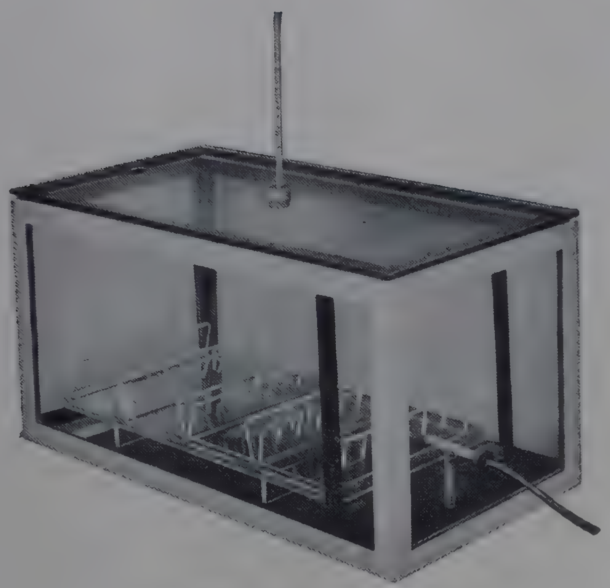
RX-105

RX-105
TAPE, measuring, length 30 metres (100 ft), plastics finished fibre glass. Tape width 14 mm. Subdivided one side m, dm and cm; other side ft, in and $\frac{1}{2}$ in. In leather case with folding handle for reeling in ... Each **£6·46** *fx*

SLIDE RULES see CALCULATORS.

Gallenkamp SALT SPRAY APPARATUS

to BS 3900 Part F4 and DEF 1053 Method 24



SA-300 with accessories

SA-300

SALT SPRAY APPARATUS, *Gallenkamp,* for testing the resistance of paints and allied materials to continuous salt spray as specified in BS 3900 Part F4 and DEF 1053 Method 24. Comprises glass panels set in a nylon coated iron frame to form a tank having internal dimensions 60 × 30 × 29 cm deep. With plate glass cover, having central 2 cm diameter thermometer hole and 2·5 cm diameter vent hole, glass atomiser fitted through the end wall and glass baffle plate to prevent spray from playing directly on test panels. The tank will accept one drainage tray SA-304 and up to four sample racks SA-306. **Without racks, tray or thermometer** ... ... Each **£16·00** *bx*

REPLACEMENT PART

SA-302 **Atomiser,** glass ... ... Each **£0·50** *ax*

ACCESSORIES

SA-304 **Tray,** drainage, Perspex, to hold four racks SA-306. Each **£2·50** *bx*

SA-306 **Rack,** Perspex, to hold six test panels ... Each **£1·70** *bx*

TJ-050 **Thermometer,** range 0 to 60°C. For details and price see entry in List No. sequence.

Suitable **air compressor** see AF-445 in List No. sequence.

SALT SPRAY CABINET

to BS 1224, ASTM B117/64 and ASTM D287/62

SA-330

SA-330

SALT SPRAY CABINET, to BS 1224, ASTM B117/64 and ASTM B287/62, for testing the resistance to corrosion by salt spray or acetic acid salt spray of electroplated materials. Comprises a plastics cabinet, 75 × 50 × 50 cm high, jacketted on three sides, an integral 40 litres brine chamber and a plastics cover, all mounted on a rigid metal frame. The water in the jacket is heated by two 1·25 kW immersion elements and the chamber is thermostatically maintained at about 35°C. A humidifier tower is built into one side and a pair of nozzles set at right angles cause the formation of a fine mist. A diaphragm type compressor is driven by a $\frac{1}{4}$ hp motor for 230/250V 50 Hz single phase supplies. With diaphragm type pressure gauge calibrated 0–40 lbf/in^2 and a thermometer which indicates the temperature in the chamber. Overall dimensions 75 × 113 × 142 cm high ... ... Each **£525·00** *fxN*

When ordering please state voltage and frequency of supply.

SAFETY EQUIPMENT

Aprons	see CP-705 et seq.	**Labels**	see LB-150 et seq.
Coats	see CP-740 et seq.	**Pipettes**	see PM-624 et seq.
Fire extinguishers	see FF-300 et seq.	**Poisons cupboard**	see FY-955
Glove box	see MA-950	**Respirators**	see CP-898 et seq.
Gloves	see CP-770 et seq.	**Screen**	see FY-957
Goggles	see CP-835 et seq.	**Spectacles**	see CP-890

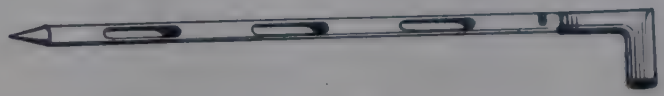
For details and prices see entries in List No. sequence.

SAMPLING STICKS

SA-570

SAMPLING STICK, brass, with three apertures for sampling grain in sacks at different depths. Overall length approx. 900 mm.

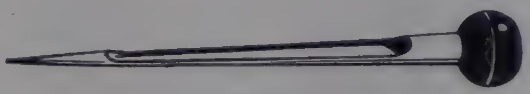
Diameter	19	25 mm	
Each	**£27·50**	**29·00**	*cx*



SA-570

SA-572

SAMPLING STICK, Belgian pattern, overall length approx. 300 mm ... ... Each **£7·00** *cx*



SA-572

Sample bottles see BT-172 et seq.
boxes see BT-820 et seq.
jars see JE-235 et seq.
tubes see TW-600 et seq.

For details and prices see entries in List No. sequence.

SAMPLE DIVIDERS

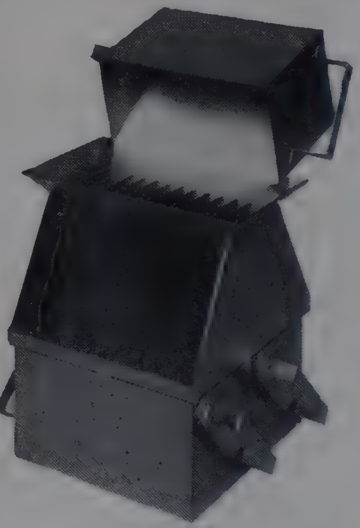
For dividing powdered or granular materials into two or more portions of similar particle size distribution to that of the bulk sample.

SA-590

SAMPLE DIVIDER, riffle pattern, gravity operated, stainless steel, based on the design recommendations of **BS 812 'Methods for sampling and testing of mineral aggregates sands and fillers', BS 1377 'Methods of testing soils for civil engineering purposes' and BS 1796 'Methods for the use of BS fine mesh test sieves.** With twelve $\frac{1}{4}$ in (6·35 mm) apertures and three sample collecting containers, each container having a capacity of approximately 300 ml ... Each **£24·80** *fx*

SA-592

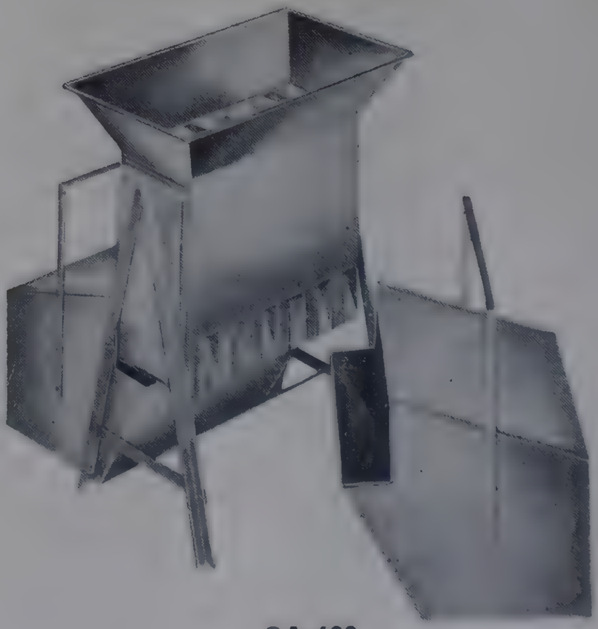
SAMPLE DIVIDER, as SA-590 but with twelve $\frac{1}{2}$ in (12·7 mm) apertures and three sample collecting containers, each container having a capacity of approximately 1500 ml ... ... Each **£29·60** *fx*



SA-592

SA-600

SAMPLE DIVIDER, riffle pattern, gravity operated, tinned steel, to **BS 1017 Part I 'The sampling of coal' Fig. 13.** With twelve 1 in (25·4 mm) apertures and three sample collecting containers, each container having a capacity of approximately 10 litres ... Each **£53·00** *mx*



SA-600

SAMPLE CRUSHERS AND GRINDERS

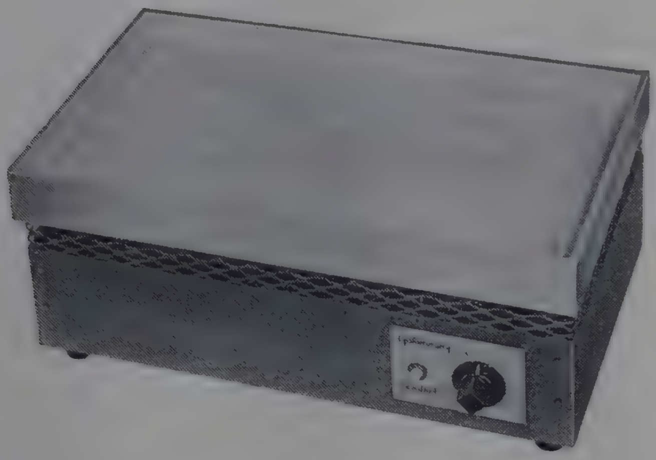
Full details of these will be found under page heading MILLS.

SIEVES AND SHAKING MACHINES

Full details of these will be found under page headings SIEVES and SHAKERS.

Gallenkamp ELECTRICALLY HEATED SAND BATH, 325°C

- **Working area 47×27 cm**
- **Temperature controlled by energy regulator**
- **Efficient insulation to protect bench top**
- **Even heating without the presence of fluids**



SA-855

An electrically heated sand bath for heating glassware containers and small objects where even heat is required but the use of a fluid bath containing water or oil is undesirable. The bath is of cast iron, hot process aluminium sprayed to resist corrosion. It is mounted on a robust steel base which is efficiently insulated to prevent overheating the bench top. Heating is by a sheathed 2 kW element controlled by an energy regulator with an arbitrary scale of 100 divisions. Maximum effective sand temperature is about 325°C. Bath dimensions 47×27×2·5 cm deep.

SA-855

SAND BATH, *Gallenkamp*, electrically heated, as specification, with energy regulator and load indicator lamp. For 220/240V a.c. single phase supplies.
Each **£60·00** *bx*

REPLACEMENT PART

HL-056 **Heating element.** For price see entry in List No. sequence.

When ordering please state voltage and frequency of supply.

FLUIDISED SAND BATHS, 350°C

Fluidised sand baths have the advantages of ease of access, rapid and uniform heat transfer and freedom from loss by evaporation.

The baths have a porous plate in the base through which clean, oil free air is blown at low pressure. Such a bath of fluidised particles behaves as a bath filled with an insulating, non-volatile liquid. It is not however possible to obtain such a close temperature control as in a true liquid because the effective specific heat of the fluidised solid is much lower than that of a liquid. On the other hand this small thermal capacity gives a rapid heat up from ambient temperature.

SA-904

Both models listed below have the following features:—

- Insulated stainless steel inner vessel.
- Air flow adjustment valve.
- Safety device to switch off the heater in the event of an air supply failure.
- Maximum temperature approximately 350°C.

Both models require up to 85 litres/min of air at 0·2 kgf/cm^2 pressure.

SA-900

FLUIDISED SAND BATH, *Tecam*, **manual temperature control,** with inner vessel 16 cm diameter and 11 cm working depth, fitted with a 750W immersion heater. Heating time to 350°C approximately 1¼ hr. For 200/250V 50 Hz supplies. Complete with 4·5 kg charge of sand ... ... Each **£87·00** *fxN*

SA-904

FLUIDISED SAND BATH, *Tecam*, **thermostatically controlled,** with inner vessel 21 cm diameter and 14 cm working depth, fitted with 1500W immersion heater. Heating time to 350°C approximately 40 min. Temperature control is by means of a thermocouple situated just above the heaters and an external pyrometer controller, range 0–600°C. Accuracy of control is within 1% of the operating temperature. For 200/250V 50 Hz supplies. Complete with a 9 kg charge of sand ... Each **£165·00** *fxN*

When ordering please state voltage and frequency of supply.

SAND BATHS

SA-920

SAND BATHS, tinned iron, with flat bottom and deep sloping sides. May also be used for oil baths.

Diameter	15	20	25 cm	
Depth	38	48	60 mm	
Ten	**£0·65**	**0·95**	**1·60**	*cx*
Each	**£0·14**	**0·17**	**0·23**	

SA-920

SCALES

SB-220

SCALES, MIRROR GLASS, vertical reading, with engraved figures and divisions. Width 30 mm.

Length	50	100 cm	
Subdivision	1	1 mm	
Ten	**£31·00**	**47·00**	*cx*
Each	**£ 3·40**	**5·20**	

SB-250

SCALES, PAPER, vertical reading, figured on edges. Overall width 56 mm, length 100 cm, subdivided in 1 mm.

Ten **£1·40** Each **£0·21** *cx*

SB-220

SB-250

SCISSORS

***SB-622**

SCISSORS, stainless steel.

Length	15	18 cm	
Ten	**£5·00**	**9·00**	*cx*
Each	**£0·55**	**1·00**	

SB-622

SCAFFOLDING	see STANDS and CLAMPS
SCALPELS **SCISSORS, dissecting**	see DISSECTING
SCOOPS	see SPATULAS
SCREWDRIVERS	see TOOLS
SEALING TAPE and TISSUE **SEALING COMPOUND**	see PLASTICS SUNDRIES
SEDIMENTATION balance **tubes**	see PARTICLE SIZE see MEDICAL SCIENCES

For details see entries in page heading sequence.

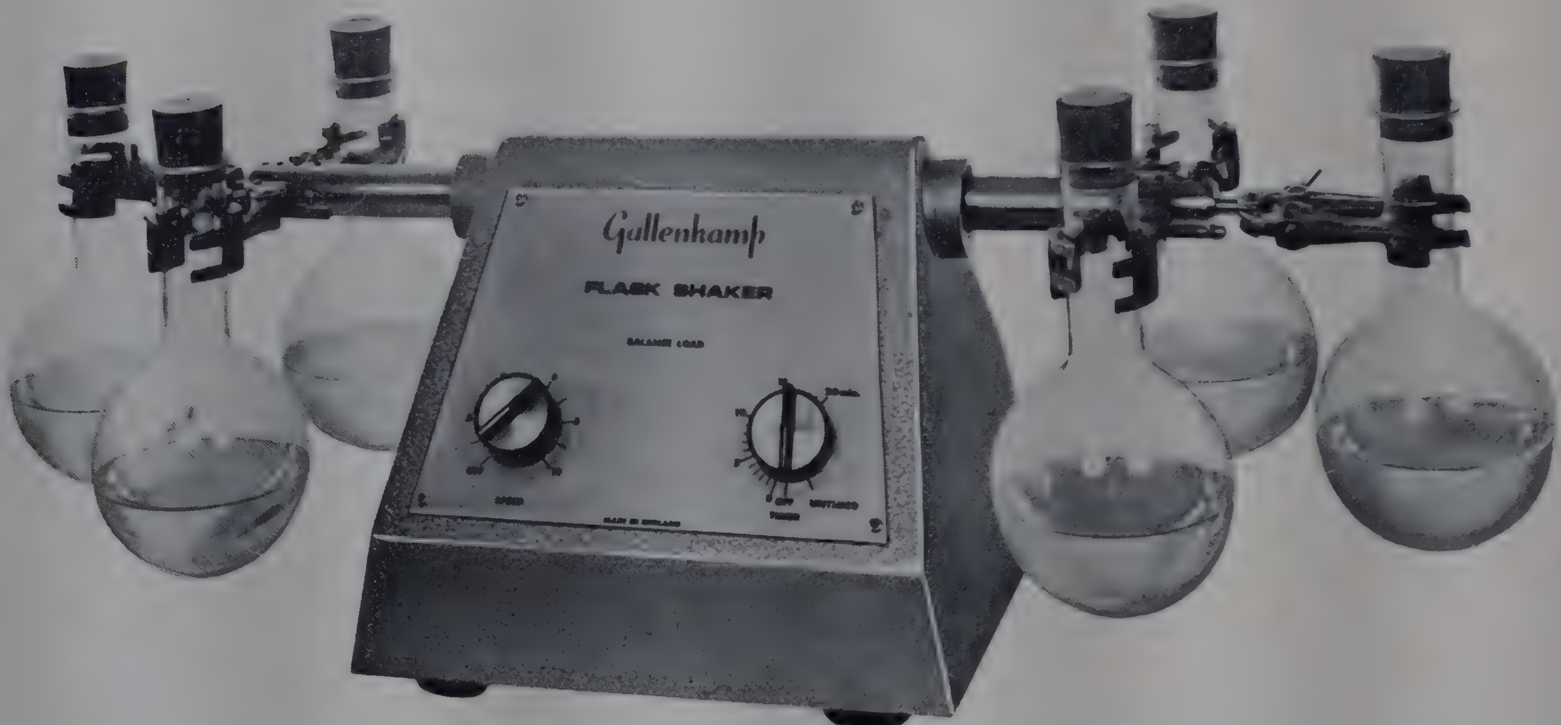
SEED TESTING

DRYING OVENS	see OV-010 et seq.
FORCEPS	see DR-022
INCUBATORS	see IH-100 et seq.
KJELDAHL ASSEMBLIES	see NP-900 et seq.
SAMPLING STICKS	see SA-570 et seq.
SINTERED GLASS PLATES	see SF-500 et seq.

For details see entries in List No. sequence.

Gallenkamp FLASK SHAKER

Suitable for dissolving, dispersing, extracting and other applications.



SD-110 with flasks

- **Accepts up to six 500 ml flasks**
- **Variable speed—solid state circuit**
- **Speed range from 100 to 800 oscillations per minute**
- **Integral 0 to 20 minute timer with continuous run position**
- **Seats firmly on the bench at all speeds**
- **Robustly constructed**
- **Positive grip clamps**
- **Designed for minimum maintenance**

The flask shaker will shake loads of up to six 500 ml flasks, each about half full of liquid, at speeds between approximately 100 and 800 oscillations per minute.

CONSTRUCTION AND OPERATION

Comprises a diecast aluminium alloy outer case which houses the drive mechanism, an oscillating shaft fitted with six positive grip clamps, and a heavy steel base fitted with vibration absorbing feet to keep the shaker firmly seated on the bench or floor. The oscillating shaft runs in robust self-lubricating bearings and the oscillating action is transmitted via an eccentric and quiet-running ball bearing linkages. The minimum number of moving parts is utilised to reduce maintenance, and the shaker runs cool at all loads.

The clamps accept objects between 5 and 80 mm diameter and can be used to hold test tubes, conical and round bottom flasks, reagent bottles and beakers, etc. Shaking action is side to side in the two end positions, assisted by an up and down motion in the case of the other four positions.

The built-in 0 to 20 minute timer has a continuous run position and also an OFF position which isolates the shaker motor.

DIMENSIONS

Overall, without flasks	71 × 26 × 23 cm high
Clearance between bench and clamps	20 cm
Weight, net	15 kg

SD-110

FLASK SHAKER, *Gallenkamp*, as specification, variable speed, with six clamps, solid state circuit and timer with continuous run and OFF positions.

For 220/240V 50/60 Hz single phase supplies.	Each	**£65·00** *bx*
For 110/120V 50/60 Hz single phase supplies.	Each	**£68·00** *bxN*

When ordering please state voltage and frequency of supply.

Gallenkamp ORBITAL SHAKER

REGD. TRADE MARK

For bottles and flasks

An orbiting base with accessory platforms used for growing cultures of micro-organisms and tissue cells. The orbiting motion of the platform minimises accretion of material on the sides of bottles and flasks, provides good transfer of gas to the samples and avoids undue buffeting of the organisms and cells.

- **Tachogenerator speed controller with solid state circuitry.**
- **Calibrated speed control scale 40 to 400 per minute.**
- **Adjustable counter-balancing of loads.**
- **Choice of eight platforms to accept conical flasks.**
- **Bottle shaker platform.**
- **Built for reliability over long operating periods.**
- **Accessory guard rail.**

OPERATION

Conical culture flasks are mounted on a platform which is driven in a circular orbital motion at a speed closely regulated by a solid state controller with tachogenerator feedback. The controlled motion of the platform provides the conditions required for the efficient transfer of oxygen or other gases between the gaseous and liquid phases in the culture flasks.
Long term reliability and quiet running result from the platform being mounted on accurately aligned double row rigid ball journals A manually adjustable counterbalancing system is provided so that vibration can be reduced for any given load. Conical flasks up to 2 litre capacity may be used.
The shaker is suitable for use in ambient temperatures from 0° to 40°C.

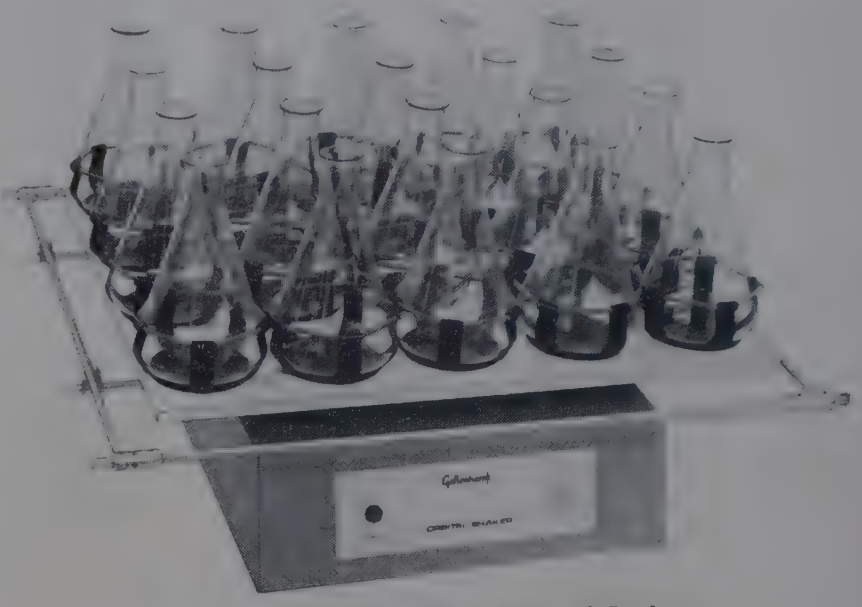
DESIGN DETAILS

The interchangeable accessory platforms are covered with a white plastics laminate for ease of cleaning and are fitted with robust plastics covered spring clips to hold conical flasks. The platforms are secured to the orbiting base plate by quick-release fasteners.
The platform drive motor is brushless and its bearings and reduction gear-box are grease packed for life.
The accessory guard rail SD-155 comprises a simple kit of *Lablox* components which the user can assemble. If the shaker is operated at floor level it protects personnel from accidental contact with the orbiting platform.
The accessory bottle shaking platform SD-146 accepts 6×2500 ml capacity Winchester bottles held horizontally and is useful for the preparation of culture media and other purposes.

TECHNICAL DATA

Orbiting speed range	40 to 400/min continuously variable
Diameter of orbit	32 mm
Ambient temperature limits	0° to 40°C
Flask and bottle loads	See Flask and Bottle Platforms below. For efficient agitation and aeration each flask or bottle should be not more than approximately one quarter full.

	W		D
Plan dimensions:			
with small platform	72	×	65 cm
with small platform and guard rail	100	×	60 cm
with large platform	92	×	77 cm
with large platform and guard rail	100	×	90 cm
Overall heights:			
to top surface of platform	28 cm		
to top of fitted 2 litre flask	57 cm		
Weight, net, including platform and counterweights, approx	50 kg		
Power rating	150W		



SD-125 with SD-138, SD-155 and flasks

SD-125

ORBITAL SHAKER, *Gallenkamp*, as specification, with tachogenerator solid state speed controller, range 40 to 400/min adjustable counterbalancing system, mains lamp and cable. **Without platforms or guard rail.**

For 220/240V 50 Hz single phase supplies	Each	**£232·00**	*bx*
For 110/120V 60 Hz single phase supplies	Each	**£235·00**	*bxN*

ACCESSORIES

FLASK PLATFORMS, interchangeable. Fitted with clips and, where necessary, retaining springs to accept conical flasks to ISO R1773 and BS 2734.

Small platforms measure 68·5×48 cm.
Large platforms measure 92×73·5 cm.

Small platforms

IH-472	**Platform,** 250 ml flasks, 36 position ...	For prices see entries in List No. sequence.
IH-474	**Platform,** 500 ml flasks, 28 position ...	
IH-476	**Platform,** 1000 ml flasks, 18 position ...	
IH-479	**Platform,** 2000 ml flasks, 11 position ...	

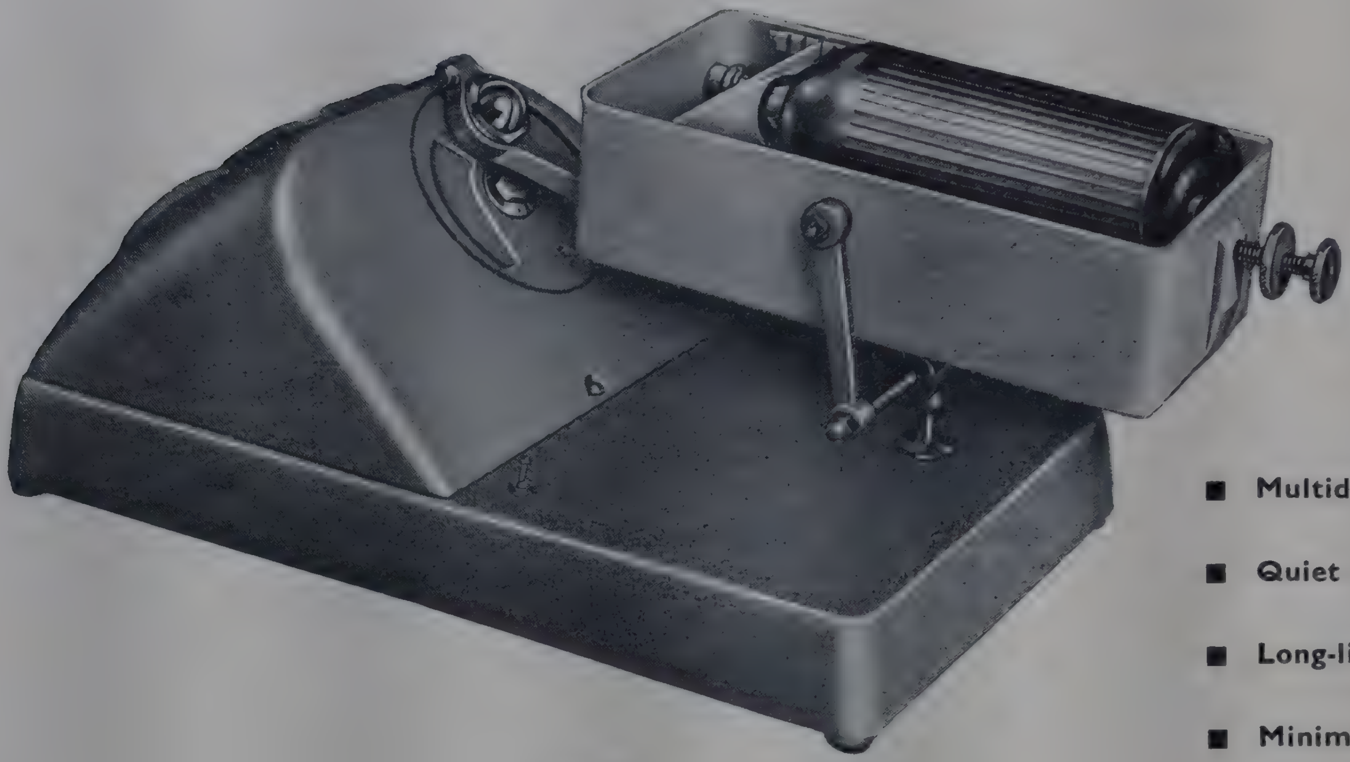
Large platforms

SD-132	**Platform,** 250 ml flasks, 77 position ...	Each	**£81·00**	*bx*
SD-134	**Platform,** 500 ml flasks, 53 position ...	Each	**£71·00**	*bx*
SD-136	**Platform,** 1000 ml flasks, 30 position ...	Each	**£68·00**	*bx*
SD-138	**Platform,** 2000 ml flasks, 20 position ...	Each	**£85·00**	*bx*
SD-146	**Platform, bottle shaker,** interchangeable with flask platforms and accepts 6×2500 ml capacity Winchester bottles held horizontally. With clamping devices and quick-release fasteners	Each	**£52·00**	*bx*
SD-155	**Guard rail kit,** *Lablox*, comprising feet, rods, connectors, nuts, bolts, washers and wrench ...	Kit	**£7·00**	*bx*

BT-172 et seq.	**Bottles,** Winchester shape, capacity 2500 ml	For details and prices see entries in List No. sequence
CX-380	**Flask, conical,** with **side indents** for increased aeration, capacities 500 to 2000 ml	
FJ-050	**Flasks, conical,** 250 to 2000 ml	

Gallenkamp SUPER SHAKER

REG'D TRADE MARK



SD-250

- **Multidirectional motion**
- **Quiet running**
- **Long-life bearings**
- **Minimum maintenance**

The shaking action of this machine which is exceptionally vigorous and efficient is achieved by a combination of motions in three dimensions. In addition to the conventional longitudinal reciprocation, a rocking motion about a transverse horizontal axis and a rotational reciprocation about a vertical axis are applied. The machine is smooth and quiet in operation. The bottle carrier will accommodate single bottles from 125 ml to 2500 ml in the Winchester series.

CONSTRUCTION

The bottle carrier and base are constructed in an aluminium alloy. A positive, adjustable clamping device is used to hold the bottle.

SHAKING DRIVE

An arm, cast integral with the bottle carrier, is connected to an inclined crank wheel by a self aligning ball bearing. This crank wheel is driven through a vee-belt at 170 rev/min by a 1/20 hp induction motor. All bearings are grease packed ball races designed to run for long periods without attention.

DIMENSIONS

Overall	36 × 63 × 36 cm
Carrier-internal	11·5 × 38 × 18 cm
Weight	36 kg

SD-250

SHAKER, SUPER, *Gallenkamp*, as specification.

For 220/240V 50 Hz single phase supplies. Each **£205·00** *bx*

For 200/210V 50 Hz single phase supplies. Each **£205·00** *bxN*

For 110/120V 60 Hz single phase supplies. Each **£205·00** *bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

SD-252 Driving belt ... ... Each **£2·00** *bx*

ACCESSORIES

BT-172 et seq. Bottles, Winchester shape. For prices and details see entries in List No. sequence.

SPECIAL PURPOSE SHAKERS

Shaking incubators, *Gallenkamp*	see	IH-350 and IH-370
Orbital incubators, *Gallenkamp*	see	IH-460 to IH-490
Shaking table, *Gallenkamp*	see	MD-160
Warburg shaker	see	ME-800
Sieve shakers	see	SD-330 and SD-332

For details and prices of above see entries in List No. sequence.

BOTTLE SHAKER

For efficient shaking of bottles, flasks, Kahn tubes etc., using a short throw at a shaking speed of approximately 275 strokes/min. For two bottles up to 2500 ml capacity in the Winchester series or several bottles of smaller capacity. The carrier accepts four racks each holding 30 Kahn tubes.

SD-270

CONSTRUCTION

The carrier is a wooden box provided with two adjustable partitions one of which clamps the bottles. The carrier is suspended on a rigid casting to which the motor is clamped and which may be bolted on a firm support.

SHAKING DRIVE

The carrier is mounted on a suspension whose bearings are sheathed with a tough resilient material. The cradle is vee-belt driven by a ¼ hp motor, and can be made to travel 12·5, 25 or 37·5 mm at each throw.

DIMENSIONS

Overall	30×84×33 cm
Carrier, internal	13×43×28 cm

SD-270
SHAKER, *Griffin,* as specification, comprising wooden carrier box with adjustable partitions mounted on rigid casting with motor.
For 220/240V 50 Hz single phase supplies Each **£95·00** *mx*

When ordering please state voltage and frequency of supply.

ACCESSORY

SD-274 **Rack, Kahn,** with perforated rubber shelves to hold 30 tubes 12 mm diameter ... ... Each **£13·30** *mxN*

SIEVE SHAKERS

These shakers impart a circular motion to the material being sieved so that it slowly travels round over the sieve gauze. Superimposed on this is a high speed vertical vibratory motion of small amplitude which continually clears the sieve apertures. The combination of these two motions provides a very effective sieving action.

SD-330
SD-332

SD-330
SIEVE SHAKER, to take 8 sieves of 200 mm dia. or 12 sieves of 100 mm dia. Complete with integral time switch, range 0 to 60 min. Overall dimensions 55×55×80 cm high. For 220/240V 50 Hz single phase supplies. **Without sieves** ... ... Each **£92·00** *fx*

SD-332
SIEVE SHAKER, to take 6 sieves of 300 mm dia., 12 sieves of 200 mm or 16 sieves of 100 mm dia. Complete with integral time switch, range 0 to 60 min. Overall dimensions 55×55×80 cm high. For 220/240V 50Hz single phase supplies. **Without sieves....** Each **£98·00** *fxN*

For **SIEVES** see overleaf.

COMMERCIAL SIEVES

SE-105

SIEVING OUTFIT, 'Interchanger', a portable outfit comprising a polished brass body, cover and receiver with four rimmed sieving disks fitted with commercial quality woven wire gauzes of 36 72, 100 and 120 mesh respectively. Complete in case with sieve brush. Dimensions, 100 mm diameter, approx. 4 cm deep ... Set **£5·04** *fx*

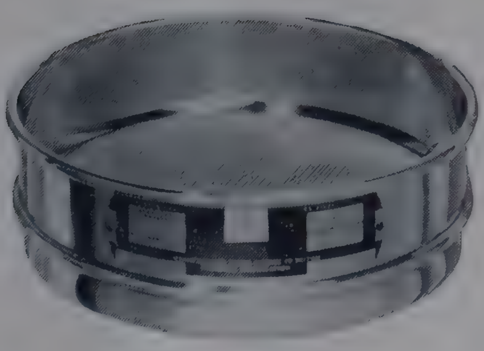
SE-130

SIEVES, brass wire gauze mounted in 200 mm diameter tinned metal frame.

Mesh, approx.	10	22	30	44	60	
				Each (all meshes)	**£1·80**	*fx*
Mesh, approx.	85	100	120	200		
				Each (all meshes)	**£1·80**	*fx*

ACCESSORY
SE-132 Cover and receiver set ... ... Each **£1·08** *fx*

SE-105 without case



SE-140, SE-150

SD-330 and SD-332

SIEVE SHAKERS. For details and prices see entries in List No. sequence.

STANDARD SIEVES
to BS 410

Each sieve is marked with the BS nominal aperture.

SE-140

SIEVES, standard, to BS 410, brass mesh mounted in 200 mm diameter polished brass frames.

Nominal aperture	5·60	4·00	3·35	2·80	2·35 mm		
Mesh, nearest	3	4	5	6	7		
Each	**£6·32**	**6·32**	**3·68**	**3·68**	**3·68**		*fx*
Nominal aperture	2·00	1·70	1·40	1·18	1·00 mm		
Mesh, nearest	8	10	12	14	16		
Each	**£3·68**	**3·68**	**3·68**	**3·68**	**3·68**		*fx*
Nominal aperture	850	710	600	500	425	355 microns	
Mesh, nearest	18	22	25	30	36	44	
Each	**£3·68**	**3·68**	**3·68**	**3·68**	**3·68**	**3·68**	*fx*
Nominal aperture	300	250	212	180	150	125 microns	
Mesh, nearest	52	60	72	85	100	120	
Each	**£3·68**	**3·68**	**3·68**	**3·68**	**3·68**	**3·68**	*fx*
Nominal aperture	106	90	75	63	53	45 microns	
Mesh, nearest	150	170	200	240	300	350	
Each	**£3·68**	**3·68**	**3·68**	**3·80**	**4·12**	**4·20**	*fx*

ACCESSORY
SE-142 Cover and receiver set, polished brass. Each **£2·32** *fx*

SE-150

SIEVES, standard, to BS 410, stainless steel mesh mounted in 200 mm stainless steel frames.

Nominal aperture	2·00		1·00			mm	
Mesh, nearest	8		16				
Each	**£5·52**		**5·52**				*fx*
Nominal aperture	500	355	250	150	106	microns	
Mesh, nearest	30	44	60	100	150		
Each	**£5·52**	**5·52**	**5·52**	**5·52**	**5·52**		*fx*
Nominal aperture	90	75	63	53	45	microns	
Mesh, nearest	170	200	240	300	350		
Each	**£5·52**	**5·52**	**5·70**	**6·18**	**6·30**		*fx*

ACCESSORY
SE-152 Cover and receiver set, stainless steel. Each **£3·48** *fx*

SIEVING ACCESSORIES

SE-160

SIEVE BRUSH, double ended, with bristles for fine sieves and brass wire for coarse sieves.
Ten **£4·70** Each **£0·52** *fx*

SE-170

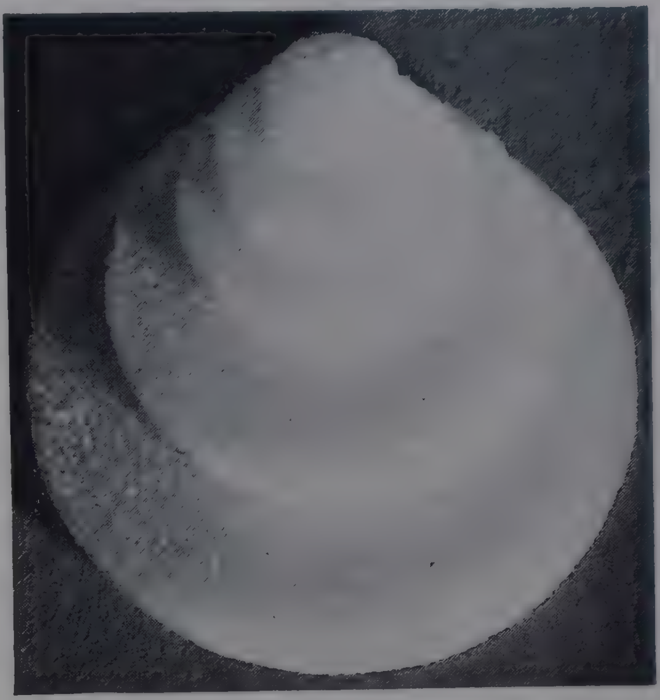
SIEVE ANALYSIS GRAPH PAPER, in pad of 25 sheets 30 × 24 cm. The upper half of the sheet is used for drawing a graph of the analysis and the lower half of the sheet is ruled for tabulation of results of up to 4 analyses. Suitable for use with any standard sieve series.
Pad **£0·36** *fx*

SINTAGLASS PLATES

PLATES, ***Sintaglass*, flat,** unmounted, borosilicate glass. Suitable for filtering applications and as a convenient substratum in botanical work for growing seeds, germinating spores, etc.

Nominal dia. †	10	15	20	30	40 mm	
Porosity	List Numbers					
0	**SF-500**	**SF-510**	**SF-520**	**SF-530**	**SF-540**	
1	**SF-501**	**SF-511**	**SF-521**	**SF-531**	**SF-541**	
2	**SF-502**	**SF-512**	**SF-522**	**SF-532**	**SF-542**	
3	**SF-503**	**SF-513**	**SF-523**	**SF-533**	**SF-543**	
4	**SF-504**	**SF-514**	**SF-524**	**SF-534**	**SF-544**	
Ten	**£3·20**	**3·60**	**3·60**	**3·70**	**4·20**	*ax*
Each	**£0·38**	**0·42**	**0·42**	**0·43**	**0·47**	

† **NOTE:** All diameters specified for sintered filter plates are nominal and may vary up to ±5%. Shrinkage during firing increases with decreasing pore size so that in general a fine porosity plate will have a smaller diameter than a coarse one of the same nominal size.



For full technical information on *Sintaglass* plates see data on pages 614 and 615.

APPARATUS INCORPORATING SINTAGLASS PLATES
will be found under the following headings.

ABSORPTION

AB-800	**Absorption tube.**

CHROMATOGRAPHY

CK-850	**Spot collector funnel.**
CL-100 **CL-130**	**Chromatography columns.**

CRUCIBLES

CW-481 to CW-515	**Filter crucibles,** Gooch, improved pattern.
CW-521 to CW-535	**Filter crucibles,** Gooch, with ground glass joint.

EXTRACTION

EV-391 to EV-413	**Extraction thimbles,** made entirely of sintered glass.
EV-421 to EV-441	**Extraction thimbles,** for use in place of paper thimbles in Soxhlet apparatus.

FILTERS

FD-300 to FD-396	**Membrane filter holder.**
FD-502 to FD-584	**Macro immersion filters, tubes and funnels.**
FD-594 to FD-654	**Micro immersion filters, funnels and beakers.**

FUNNELS

FM-601 to FM-894	**Filter funnels, cylindrical and Buchner.**
FM-923 to FM-964	**Funnels, Hirsch.**

GAS ANALYSERS

GC-176	**Gas analysis absorption vessel, Shepherd.**

GAS DISTRIBUTION

GD-800 to GD-802	**Gas distribution tubes,** with domed sintered plate.
GD-820 to GD-834	**Gas distribution tubes,** with flat sintered plate.
GD-841 to GD-853	**Gas distribution tubes,** thimble form.
GD-951 to GD-994	**Gas filter tubes.**

GAS GENERATORS

GE-040	**Semi-micro gas generator.**

GAS WASHBOTTLES

GF-640 to GF-702	**Gas washbottles, Drechsel,** with domed sintered distributor.
GF-740 to GF-772	**Gas washbottles, Drechsel,** with flat sintered distributor.
GF-801 to GF-821	**Gas washbottle,** with excellent absorption at very high flow rate.

MANOMETERS

MB-060	**Manometer,** Anschutz.

MERCURY

MF-880	**Mercury cleaning apparatus.**

SINTAGLASS SINTERED GLASSWARE

TECHNICAL INFORMATION

- **Porosities controlled to well within requirements of BS 1752**
- **Non-friable sintered plates**
- **Made from borosilicate glass**
- **Porosities colour coded for easy identification**
- **Excellent uniformity of pore size**
- **Robust construction**

Gallenkamp have been making high quality sintered glassware for over twenty-five years. This experience, together with the production control techniques employed, enables us to manufacture filters to closer porosity tolerances than those specified in BS 1752 'Laboratory Sintered or Fritted Filters'. In the table shown below, it will be noted that there is no possibility of overlap between adjacent ranges of maximum pore diameters with *SintaGlass* and therefore the performance of each porosity is significantly different from the performance of those on either side. This is an important refinement on the wider tolerances permitted by BS 1752.

POROSITIES AND APPLICATIONS

Porosity	Code colour	BS 1752 specified range of maximum pore dia.	*SintaGlass* range of maximum pore dia.	Principal uses
		μm	μm	
0	White	150 – 250	**200 – 250**	Coarse distribution of gas in liquids.
1	Yellow	90 – 150	**100 – 120**	Filtration of very coarse precipitates. Support for absorptive layers for filtering gelatinous precipitates. Gas distributors in liquids. Extraction of coarse grain material.
2	Green	40 – 90	**40 – 50**	Preparative work with crystalline precipitates. Medium gas filters. Mercury filters. Extraction of medium grain material.
3	Black	15 – 40	**20 – 30**	Preparative work with fine precipitates. Analytical work with medium precipitates. Fine gas filters. Mercury filters. Extraction of fine grain material.
4	Orange	5 – 15	**5 – 10**	Analytical work with very fine precipitates ($BaSO_4$, Cu_2O). Preparative work with finest precipitates. Safety valves for mercury.
†5	Blue	Not greater than 2	**1 – 1·8**	Bacteriological filtration.

† See Note on Bacteriological Filters on page 615.

SINTAGLASS SINTERED GLASSWARE

TECHNICAL INFORMATION

ADVANTAGES OF USE

For filtration

Not affected by reagents such as ammonia or sulphuric acid which destroy filter paper.

Tedious preparation of asbestos filter beds eliminated.

Reproducible analytical results assured due to close tolerance control of porosity in manufacture.

Constant weight quickly attained by drying at 110°C.

Easily cleaned for re-use.

Filtration process visible all the time.

For gas absorption and washing

Resistant to wet, corrosive gases.

Low back pressure on gas line, particularly when using coarse porosity disks.

High velocity with relatively low pressure.

Cleans the gas stream of suspended material as well as dispersing the gas.

DRYING AND IGNITION

Sintered crucibles are specially suitable for precipitates which have to be dried to constant weight at 110°C. They can be used with boiling liquids and placed directly in a drying oven up to 150°C, then left to cool in a desiccator or in the open air. When ignition is required an electric furnace is necessary. The crucibles should be placed in the cold furnace, slowly heated to a temperature not exceeding 580°C and allowed to cool down again to at least 200°C before removal from the furnace. When using filters with porosity 5 plates, greater care is needed when heating, especially when the filter plate is wet. These filters should always be placed in a cold oven and heated gradually, since the sudden evolution of steam from the fine pores may set up sufficient pressure within the filters to crack them.

SIZE OF PLATES

All diameters specified for sintered filter plates are nominal and may vary up to ±5%. Shrinkage during firing increases with decreasing pore size so that in general a fine porosity plate will have a smaller diameter than a coarse one of the same nominal size.

GAS PRESSURE TEST

The approximate pressure necessary to pass air through plates wetted with water at 20°C.

SintaGlass Porosity	Pressure, torr
0	10
1	20
2	50
3	90
4	350
5	1800

CLEANING AND CARE OF SINTERED FILTERS

Caution

Avoid immersing the complete item of sintered glassware for prolonged periods in solutions containing either hydrochloric acid, as this may discolour the enamel of the inscription or caustic alkalis or strongly alkaline detergents which will attack the porous glass plate.

It is not good practice to immerse sintered glassware in any strong cleansing agent; it is always preferable to wash the plate through with a mild reagent and then rinse with several washes of distilled water.

Before use

Wash new filters thoroughly with hot hydrochloric acid and then with water until a neutral filtrate is obtained. This will remove any loose glass particles and accumulated dust.

After use

To ensure long and satisfactory service wash filters with water immediately after use, in the reverse direction from that used in filtration, and then thoroughly clean. Do not connect to a water tap to back flush as excessive pressure can rupture the sintered disk. The following chemicals will be found useful for removing stubborn compounds.

General cleaning	Laboratory detergents such as CM-742
Organic substances	Laboratory surfactants such as CM-754 or potassium permanganate (see below)
Fat	Carbon tetrachloride
Albumen	Warm ammonia or hydrochloric acid
Cupric oxide	Hydrochloric acid (hot) with potassium chlorate
Barium sulphate	Sulphuric acid conc. (hot)
Mercury residues	Aqua regia (hot)
Silver chloride	Ammonia

Finally rinse the filters well with distilled water, dry, and store in a dust-free place.

Use of potassium permanganate

Potassium permanganate is a satisfactory reagent for removing organic (and many inorganic) deposits; it cleans efficiently without damaging the filter.

Treat the plate with a 1% aqueous solution of potassium permanganate followed by a few drops of concentrated sulphuric acid. The resulting heat of reaction enhances the oxidising power of the mixture.

Then wash and dry the filter and remove any stain from precipitated manganese dioxide by treatment with acidified 20 vol. hydrogen peroxide. A final rinse with distilled water normally leaves the plate chemically clean.

NOTE ON BACTERIOLOGICAL FILTERS, POROSITY 5

Pore Size

Filter plates of porosity 5 will retain bacteria of sizes greater than 1·8 micron, but owing to the size range of different organisms it is impossible for us to guarantee these filters bacteriologically.

Filtration Rate

To provide the fastest rate of filtration the very fine porosity 5 plate is made very thin and is supported by a layer of porosity 3. This construction is to be understood throughout our catalogue whenever reference is made to porosity 5.

Certification

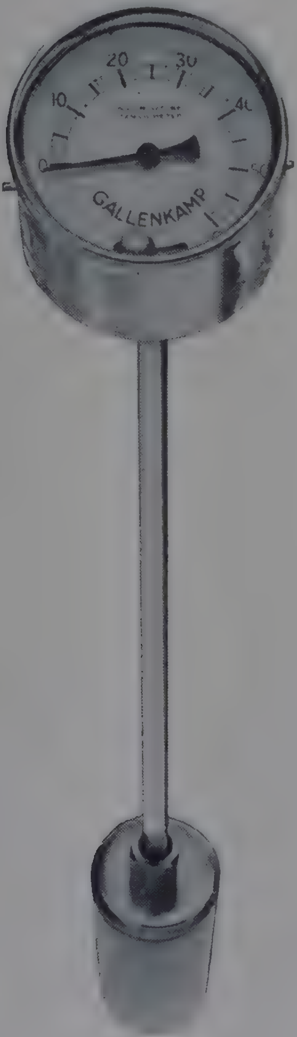
Each filter of porosity 5 is supplied complete with a test certificate showing the maximum pore size and permeability as determined by methods described in BS 1752 'Laboratory Sintered or Fritted Filters'.

Gallenkamp SOIL MOISTURE TENSIOMETERS

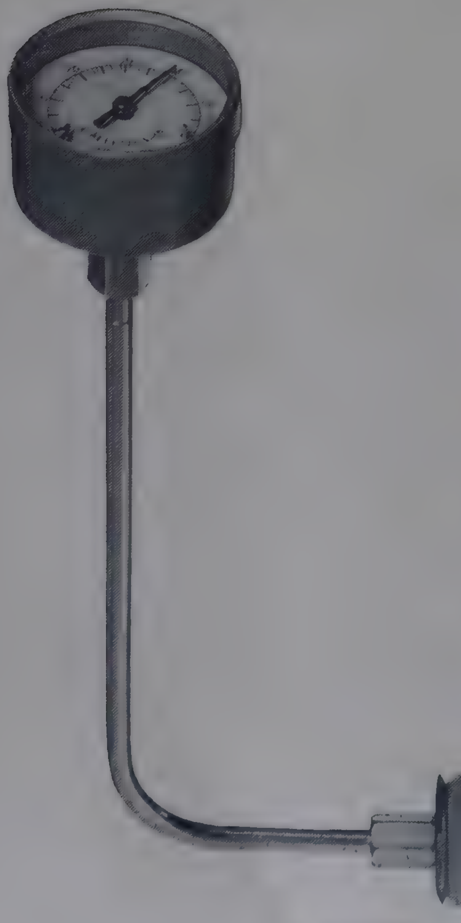
REGD TRADE MARK

For the determination of the force which a root must overcome in order to draw water from soil.

- **Continuous reading of soil moisture tension**
- **Independent of electrical properties of the soil**
- **Suitable for soil depths between 7·5 cm and 60 cm**
- **Supplied with comprehensive instructions for use**



SH-080
(SH-090 is similar)



SH-085

PRINCIPLE

The reading on the gauge indicates the moisture tension of the soil and is directly related to the effort plants must exert to extract water from the soil. Tensions so measured are directly comparable and any particular tension indicates the same degree of water availability. The moisture tension in soil varies with the moisture content, the soil particle size and the packing of the soil. In any given position, the last two factors tend to remain constant so that variations in soil moisture tension reflect the changes in moisture content.

SPECIFICATION

Comprises a porous pot connected to a 6 cm dia. dial vacuum gauge calibrated 0–60 cm Hg. Each is despatched filled with water, the porous pot being enclosed in a waterproof wrapping to prevent loss of water by evaporation during transit and storage. When in use the gauge is protected from chemical sprays and water by a polythene cover. **The tensiometer must be protected from freezing.**

SH-080

SOIL MOISTURE TENSIOMETER, *Gallenkamp*, **growers model,** as specification, for maximum depth of 30 cm. Filled with water ready for use, with gauge cover and instructions. ... ... Each **£9·20** *bx*

SH-085

SOIL MOISTURE TENSIOMETER, *Gallenkamp*, **bench model,** for use in shallow benches or troughs, minimum depth 7·5 cm, as specification, but with L-shape stem. Filled with water ready for use, with gauge cover and instructions ... ... Each **£10·90** *bx*

SH-090

SOIL MOISTURE TENSIOMETER, *Gallenkamp*, **orchard model,** as specification, for maximum depth of 60 cm. Filled with water ready for use, with gauge cover and instructions. ... ... Each **£10·60** *bx*

REPLACEMENT PARTS

SH-101	**Porous pot,** in waterproof cover.	Ten	**£6·00**	Each	**£0·66**	*bx*
SH-102	**Top washer,** rubber.	10 packs	**£4·70**	Pack of 10	**£0·52**	*bx*
SH-103	**Bottom gasket,** rubber.	Ten	**£0·64**	Each	**£0·14**	*bx*
SH-104	**Protective cover,** polythene.	Ten	**£3·70**	Each	**£0·43**	*bx*

ACCESSORIES

SH-106	**Filler,** a screw capped plastics bottle with a flexible tube for topping up tensiometers.	Ten	**£1·20**	Each	**£0·19**	*bx*
SH-107	**Spanner,** $\frac{5}{16}$ in. Whitworth, for unscrewing both connections of tensiometers	Ten	**£2·60**	Each	**£0·32**	*bx*
SH-108	**Soil auger,** steel 4 cm dia., 90 cm overall length, with 12 mm dia. shaft and welded cross handle.			Each	**£5·95**	*bx*

SOIL CONDUCTIVITY

SH-120

SOIL SALTS CONDUCTIVITY BRIDGE, *Electronic Switchgear,* **Type MC4.** A portable, transistorised, battery operated instrument for measuring the soluble salt content of soils in the range 0 to 100 CF (Conductivity Factor) units. CF measurements give a valuable guide to fertilisation requirements, and the quality of water for effective irrigation. A beaker cell, with constant K=1·0 and sample volume approximately 12 ml, plugs into the side of the instrument. Complete with one cell, cell cleaning brush, thermometer 0 to 50°C, sample settling bottle, water measuring cylinder and one *Ever Ready* Type PP4 battery. ... ... Each **£40·00** *fx*

REPLACEMENT PARTS

SH-122	**Measuring cylinder**	Each	**£2·65** *cx*
BT-210	**Sample settling bottle,** 125 ml ...	For prices see entries in List No. sequence	
EJ-057	**Cell,** K=1·0		
EJ-058	**Thermometer,** without case		

SOIL TESTING OUTFIT

When certain soils are shaken with water they yield suspensions which take several hours to settle. By addition of a finely divided insoluble substance such as barium sulphate, the suspended soil particles are carried down with the settling $BaSO_4$ particles thereby leaving a clear supernatant liquid ready for pH measurement with the pH indicator included in the outfit.

SH-140

SOIL TESTING OUTFIT, *BDH,* comprising twelve test tubes, cleaning brush, 24 rubber stoppers, 100 g $BaSO_4$, 100 ml *BDH* soil pH indicator, 500 ml distilled water, a small spatula and a pH colour chart in wooden case ... ... Each **£8·75** *mx*

REPLACEMENT PART

SH-145 **Soil pH indicator,** *BDH,* in 100 ml polythene bottle. Each **£0·55** *mx*

SOIL HYDROMETERS

SH-161

SOIL HYDROMETER, to BS 1377, for determining particle size distribution in soils. Range 0·995 to 1·030 g/cm³. Calibrated at 20°C. Overall length approx. 350 mm Each **£2·60** *mx*

SH-166

SOIL HYDROMETER, to ASTM D422 designation 152H, for determining particle size distribution in soils. Range −5 to +60 g/litre. Calibrated at 68°F. Overall length approx. 280 mm ... ... Each **£2·60** *mx*

SH-167

HYDROMETER JAR, *Technico,* **Bouyoucos,** with two marks at 1130 and 1205 ml, height 458 mm, dia. 70 mm. Each **£1·35** *ax*

SOIL CONDUCTIVITY METER
CF

SH-120

SOIL THERMOMETER

SH-210

THERMOMETER, sheathed, soil temperature, comprising solid stem mercury-in-glass thermometer fitted into a stout glass sheath with the bulb embedded in a layer of paraffin wax to ensure correct readings on drawing thermometer to surface. Range −5 to +40°C subdivided in 0·5degC. For use with steel tubes SH-215 driven into the soil ... ... Each **£6·50** *fxN*

ACCESSORIES

SH-215 **Steel tubes,** seamless, with copper cap and length of chain for suspending thermometer SH-210 in the tube at the required depth.

For use at	30	120 cm depth	
Each	**£4·50**	**6·00**	*fxN*

Gallenkamp
REGD. TRADE MARK

SEDIMENTATION BALANCE

For Particle Size Analysis

- Full range 5µ to 75µ in 6 hours
- Illuminated read-out
- Operates on 0·5 g of sample
- Optional auto-recording system

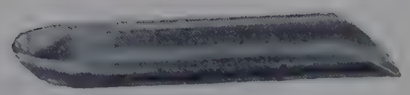
For full details see PC-650 et seq. in List No. sequence.

Other apparatus for soil testing will be found under the following page headings:

Density
Mills
Moisture
Ovens
Sampling
Sieves

SPATULAS, SCOOPS AND SPOONS

(All dimensions given are nominal)



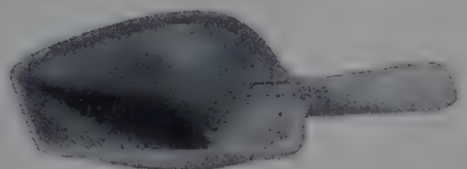
SJ-050, SJ-055

SJ-050

SCOOP, aluminium, length 100 mm, width 30 mm.
Ten **£2·75** Each **£0·34** *cx*

SJ-055

SCOOP, stainless steel, overall length 100 mm, width 30 mm ... ... Ten **£7·60** Each **£0·84** *cx*



SJ-062

SJ-062

SCOOPS, rigid polythene. Strong tough scoops suitable for handling many dry chemicals.

Scoop length	100	140	190 mm	
Overall length	180	240	300 mm	
Ten	**£1·20**	**2·70**	**5·40**	*mx*
Each	**£0·19**	**0·33**	**0·60**	

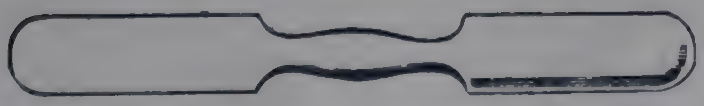
SJ-080

***SJ-080**

SCOOPS, stainless steel, cylindrical, with stainless steel handle.

Length of base	100	150	200	230 mm	
Overall length	190	260	320	350 mm	
Each	**£1·05**	**1·40**	**1·80**	**2·25**	*mx*

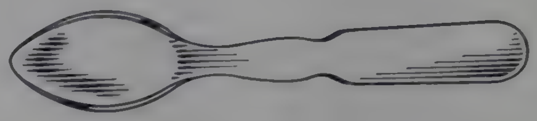
SCOOPS, glass, see WEIGHING ACCESSORIES.



SJ-122

SJ-122

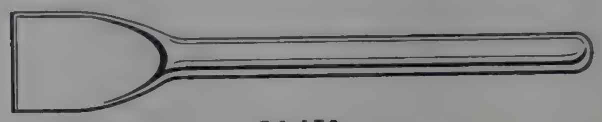
SPATULA, horn, polished and flexible with thin rounded ends, length 100 mm, width 13 mm.
Ten **£2·50** Each **£0·31** *cx*



SJ-130

SJ-130

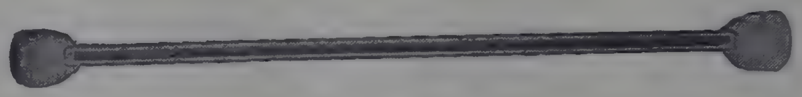
SPATULA, horn, rigid, with spoon end, length 150 mm spoon width 25 mm.
Ten **£5·90** Each **£0·66** *cx*



SJ-150

SJ-150

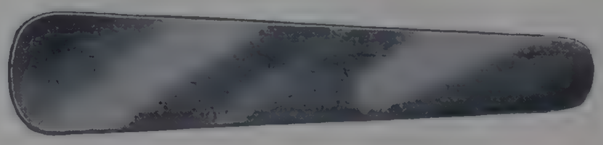
SPATULA, polythene, flexible, with one blade. Length 120 mm, blade width 15 mm. In pack of 10.
10 packs **£2·40** Pack **£0·31** *cx*



SJ-155

SJ-155

SPATULA, polythene, with metal insert in handle and blade at each end. Length 220 mm, blade width 17 mm
Ten **£3·20** Each **£0·38** *cx*



SJ-180

SJ-180

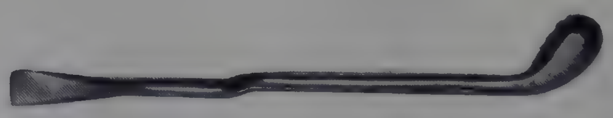
SPATULAS, nickel, lightweight, flat with rounded ends.

Overall length	90	150 mm	
Max. width	20	30 mm	
Ten	**£2·00**	**4·00**	
Each	**£0·26**	**0·45**	*cx*

SJ-190

SJ-190

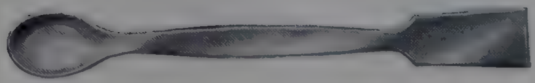
SPATULA, Nuffield pattern, stainless steel. With scoop one end and angled blade the other. Overall length 140 mm, width 10 mm.
Ten **£1·45** Each **£0·21** *cx*



SJ-195

SJ-195

SPATULA, stainless steel. One end has a deep offset spoon which can reach any part of the common sizes of reagent bottles. The other end has a chisel type blade with one square and one rounded corner suitable for scraping adherent material or lifting single particles. A cranked channel section handle provides rigidity and convenient holding. Length 190 mm, spoon width 20 mm.
Ten **£7·60** Each **£0·84** *cx*

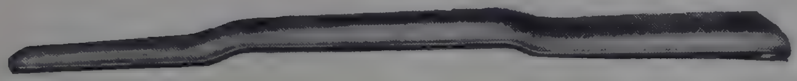


SJ-200

SJ-200

SPATULAS, stainless steel, heavyweight, with one spatulate end and one spoon end.

Overall length	150	210 mm	
Max. width	18	18 mm	
Ten	**£3·80**	**5·90**	*cx*
Each	**£0·44**	**0·66**	



SJ-205

SJ-205

SPATULA, stainless steel, double ended, scooped, 175 mm long, 19 mm wide at one end and 10 mm at the other ... ... Each **£0·40** *cx*

SJ-210, SJ-212

SJ-210

SPATULAS, Chattaway pattern, nickel.

Overall length	100	130	150	200 mm	
Max. width	5	5	8	10 mm	
Ten	**£2·60**	**2·80**	**2·80**	**3·80**	*cx*
Each	**£0·32**	**0·34**	**0·34**	**0·44**	

SJ-212

SPATULAS, Chattaway pattern, stainless steel.

Overall length	100	130	150	200 mm	
Max. width	5	5	8	10 mm	
Ten	**£2·35**	**2·55**	**2·50**	**3·30**	*cx*
Each	**£0·30**	**0·32**	**0·32**	**0·39**	

SJ-250

SJ-250

SPATULAS, palette knives, with stainless steel parallel sided, flexible blade set in wood handle.

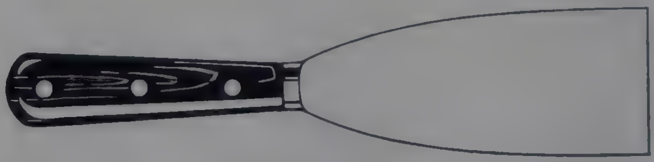
Blade length	100	150	200	250	300 mm	
Blade width	20	25	30	40	45 mm	
Ten	**£5·90**	**7·00**	**9·40**	**12·80**	**18·50**	*cx*
Each	**£0·66**	**0·78**	**1·04**	**1·40**	**2·05**	

SJ-255

SJ-255

SPATULAS, palette knives, with stainless steel tapered sided, flexible blade, set in wood handle.

Blade length	75	100	150 mm	
Blade width, max.	15	20	25 mm	
Ten	**£5·80**	**5·90**	**7·20**	*cx*
Each	**£0·64**	**0·66**	**0·80**	



SJ-260

SJ-260

SPATULA, filling knife, with 50 mm wide steel blade set in wood handle. Blade length 130 mm.
Ten **£7·20** Each **£0·80** *cx*

SJ-330

SJ-330

SPATULA and pocket knife, combined, with stainless steel blades. Overall length, closed 80 mm, open 180 mm.
Ten **£14·00** Each **£1·55** *cx*

SJ-402

***SJ-402**

VIBRO-SPATULA, *Mettler,* for rapidly dispensing small quantities of powdered or granular material. Vibration is started and stopped by depressing and releasing a button on the handle and the amplitude of vibration is varied by adjusting a milled ring. With four sizes of interchangeable, stainless steel spatula blades, including one for dispensing into narrow-necked vessels, and a cleaning brush all packed in a plastics storage tray. For 100/125V or 200/250V a.c. single phase supplies.
Each **£16·15** *kx*

When ordering please state voltage and frequency of supply.

SPECIMEN bottles	see	BOTTLES
,, **boxes**	see	BOXES and BIOLOGICAL SCIENCES
,, **jars**	see	JARS
,, **tubes**	see	TUBES
SPECTACLES	see	CLOTHING, PROTECTIVE
SPECIFIC GRAVITY	see	DENSITY and HYDROMETERS

SPECTROMETERS

STUDENT SPECTROMETER

SK-020

A simple table spectrometer for demonstrating the more important experiments in spectroscopy. The instrument has a divided circle 138 mm diameter reading the rotation of the telescope by vernier to 1 minute. The telescope of 150 mm focal length and 20 mm aperture is fitted with an adjustable eyepiece and crosswires and the collimator of 150 mm focal length and 20 mm aperture is provided with an adjustable slit fitted with a reducing wedge. The prism table of 80 mm diameter is equipped with levelling screws and fitted with a cursor reading directly to 0·5° from the main scale and independent of telescope movement.

SK-020

SPECTROMETER, student model, *B & S*, as specification, with 60° dense flint prism. ... Each **£95·00** *fxN*

DIRECT READING WAVELENGTH SPECTROMETER

SK-050 with accessories

A versatile instrument for educational, research and industrial investigations into emission and absorption spectra in the range 200 nm to 1000 nm.

DESCRIPTION

The basic instrument is supplied with a glass prism, a calibrated drum wavelength range 385 to 800 nm readable to 0·1 nm, a shutter eyepiece, crosswire and input slit adjustable 0 to 1·5 mm wide and 2 to 10 mm high.

A silica prism range 200 to 400 nm and a rocksalt prism range 700 to 1000 nm are available as optional extras. Both are supplied ready mounted on small circular tables which can be fitted to the tangent arm connected to the rotating drum. When these alternative prisms are used, accessory graduated sleeves must be fitted over the drum. A fluorescent eyepiece is listed to replace the Ramsden eyepiece for examination of UV spectra. A thermopile with galvanometer and scale is available for use in the IR region.

The eyepiece can also be removed and replaced either by a camera for photographic work or by an output slit identical with the input slit to enable the spectrometer to be used as a monochromator.

SK-050

SPECTROMETER, *B & S*, **direct reading, range 385 to 800 nm,** with glass prism, calibrated drum, shutter eyepiece, crosswire and adjustable input slit.
Each **£370·00** *fxN*

ACCESSORIES

SK-052	**Silica prism,** range 200 to 400 nm ...	Each	**£72·00** *fxN*
SK-053	**Rocksalt prism,** range 700 to 1000 nm	Each	**£66·00** *fxN*
SK-054	**Graduated sleeve, arbitrary scale,** for use with SK-052 and SK-053. Supplied with calibration tables.	Each	**£18·50** *fxN*
SK-056	**Graduated sleeve, calibrated 200 to 400 nm,** for use with SK-052 only	Each	**£18·50** *fxN*
SK-057	**Fluorescent eyepiece**	Each	**£18·50** *fxN*
SK-059	**Mounting rods,** to carry auxiliary apparatus.	Pair	**£12·00** *fxN*
SK-061	**Output slit**	Each	**£55·00** *fxN*
SK-063	**Thermopile outfit**	Each	**£228·50** *fxN*

SPECTROSCOPES

SK-100

SPECTROSCOPE, diffraction, *Ealing*, for direct vision, having a dispersion of 11°. The slit is of fixed width, protected by a glass cover to prevent dust from entering. With adjustable eyepiece for focusing the spectrum. Overall length approx. 60 mm. With case.
Each **£9·00** *fx*

SK-100

SK-130

SPECTROSCOPE, wavelength, prism, *Ealing*, for taking direct wavelength readings and having a dispersion of 10°. Scale reading is viewed in the same field as the spectrum, each division of the scale representing 100 Å. An adjustable slit and a control for focusing are provided. Scale position in relation to spectrum is adjustable. Overall length approx. 90 mm. With case.
Each **£65·00** *fx*

ACCESSORY For SK-130

SK-134 **Holder** for positioning a test tube in front of slit. Accepts one test tube up to 25 mm dia. ... Each £2·60 *fx*

SK-130

REVERSION SPECTROSCOPE

For spectroscopic examination of haemoglobin and measurement of carboxyhaemoglobin in blood.

PRINCIPLE

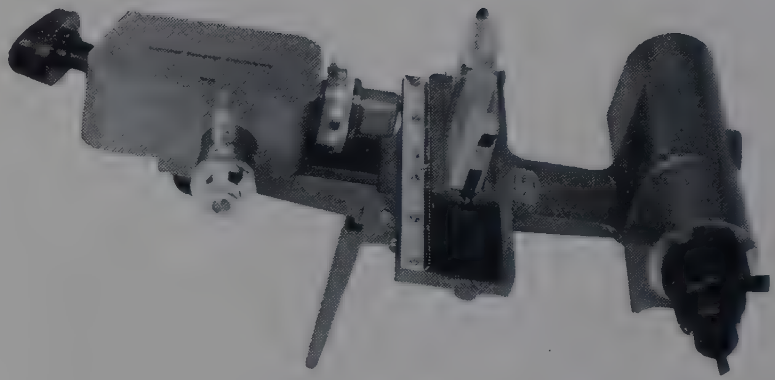
The reversion method ensures great accuracy in setting. One spectrum moves across the other in an opposite direction, so that an absorption band or emission line in one spectrum can be set to coincide with the same band, or line, in another spectrum. Readings are taken on a graduated drum with 100 divisions in steps of 1Å. An index scale has divisions representing one drum revolution. Scale range 3000 to 7000Å. The slit is symmetrical and the width is controlled by the rotation of a graduated ring. A cylindrical condensing lens concentrates the light so that the whole slit aperture is filled.

SK-200

SPECTROSCOPE, Hartridge reversion, *Ealing*, as specification. Without holders, troughs, illuminating lamp or carrying case ... ... Each **£99·00** *fxN*

SK-230

SPECTROSCOPE OUTFIT, Hartridge Reversion, *Ealing*, comprising spectroscope, stand with lamp, holders for glass troughs and test tubes, troughs 5 mm and 10 mm, baffle plate and case. For 200/240V a.c. single phase supplies ... ... Each **£182·50** *fxN*


SK-230

SPECTROPHOTOMETER/COLORIMETER

Employs a diffraction grating, giving a constant band-pass of 20 mμ over the range 340 to 950 mμ. Any section of this range can be selected with a calibrated dial. Samples are inserted in selected test tubes or cuvettes, and an automatic shutter protects the phototube and provides continual zero checks. Transmittance or absorbance can be read directly on a mirrored scale. For colorimetric work the instrument provides direct reading of optical density. The instrument can also be employed as a spectrophotometer, so that absorbance curves can be plotted. For operation in the infra-red region of 650 to 950 mμ accessories SL-124 and SL-125 must be used.

***SL-120**

SPECTROPHOTOMETER/COLORIMETER, *Bausch and Lomb* **Spectronic 20,** range 340 to 650 mμ, supplied with twelve 11·6 mm internal diameter selected test tubes and test tube adapter, directions for use and a plastics dust cover. Complete with transformer for 200/240V 50/60 Hz supplies ... ... Each **£227·00** *fxN*

SL-120

ACCESSORIES

*SL-124	Red-sensitive photocell ...	for work in 650-950 mμ region	Each	£4·25 *fxN*
*SL-125	Red filter ...		Each	£1·25 *fxN*
*SL-127	Cuvettes ...	... ...	Pair	£11·30 *fxN*

REPLACEMENT PARTS

*SL-128	Spare lamp	Each	£2·00 *fxN*
*SL-129	Test tubes, selected, 11·6 mm ...	Pack of 12	£4·80 *fxN*

CECIL CE303 SERIES GRATING SPECTROPHOTOMETERS

325 to 1000 nm

Versatile, single beam instruments for measurement of absorbance, transmittance, concentration and stream analysis monitoring.

- **High reliability and stability**
- **Diffraction grating monochromator**
- **35 cm long wavelength scale**
- **Automatic stray light filter insertion**
- **Recorder and printer outlets**
- **All solid state electronics**

CECIL INSTRUMENTS

SL-685 with SL-880

DESCRIPTION

The CE303 is a grating spectrophotometer for rapid manual, flow-cell or automatic sampling. The high stability of the instrument makes it ideal for continuous monitoring applications.

The CE373 linear readout spectrophotometer offers convenience of operation. Measurements may be made on weakly absorbing samples in relatively short pathlength because of the scale expansion facilities.

The CE393 spectrophotometer offers essentially the same advantages as the CE373 coupled with direct digital readout of results. An auto zero controller available as an accessory provides for press button setting of absorbance zero. Reaction rate calculation is also provided by this accessory designated CE239.

CECIL CE303 SERIES GRATING SPECTROPHOTOMETERS

TECHNICAL DATA

Wavelength range:	325 to 1000 nm
Bandwidth:	10 nm
Wavelength accuracy:	Better than 2 nm
Wavelength scale:	35 cms long set by dual ratio control giving both coarse and fine adjustment
Straylight:	Less than 0·5% at 340 nm
Straylight filter:	Automatically inserted between 325 and 390 nm
Meter readout:	Scaled in both absorbance and transmittance with antiparallax mirror
Linearity:	Better than 0·25% at accessory terminals
Absorbance zero:	Set by a single dual ratio control giving both coarse and fine setting
Zero drift:	Less than ±0·1% transmittance, short term (15 min)
Absorbance zero stability:	Better than ±0·001 absorbance units short term
Recorder output:	10mV full scale deflection
Printer output:	1 volt full scale deflection
Source:	Air cooled 36 watt tungsten lamp
Sample cells:	Cells of up to 40 mm pathlength, a range of microcells and semi-microcells, 10, 20 and 40 mm manual flowcells, 10 mm and 20 mm automatic flowcells and stream analysis flowcells. The standard instruments accept test tubes 12 to 25 mm dia. up to 100 mm long using accessory SL-714
Overall dimensions:	54×24×38 cm

Additional Technical Data for Model CE373

Linear readout in concentration, absorbance and transmittance.

20:1	Absorbance scale expansion in five ranges, 0–2, 0–1, 0–0·5, 0–0·2, 0–0·1A full scale
10:1	Transmittance scale expansion

Concentration calculation—direct reading of any required concentration for samples with absorbance values between 0·1A–2·5A set by a ten turn control.

Additional Technical Data for Model CE393

Readout:	Bright co-planar seven segment display
Readout range:	−1998 to +1998
Readout resolution:	1 digit up to 1200
Concentration factor:	Set between 0 and 1 by ten turn control with display of factor
BCD output	For digital printer
Ranges:	Concentration, concentration×10, absorbance and transmittance

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SL-680

SPECTROPHOTOMETER, *Cecil* CE303, scaled linear in transmittance and non-linear in absorbance, as specification. Wavelength range 325 to 1000 nm, with tungsten lamp, stabilised power supply, four position cell slide, four cell holders with 10 mm pathlength glass cells. Includes spare tungsten lamp, spare fuse, dust cover and instructions manual. Fitted with 2·5 metres mains cable. For 110/120V, 200/210V and 220/240V 50/60 Hz single phase supplies ... ... Each **£349·00** *fx*

SL-685

SPECTROPHOTOMETER, *Cecil* CE373, as SL-680 but linear in absorbance, transmittance and concentration. For 110/120V, 200/210V and 220/240V 50/60 Hz single phase supplies ... ... Each **£477·00** *fx*

SL-690

SPECTROPHOTOMETER, *Cecil* CE393, as SL-680 but with digital read-out of absorbance, transmittance and concentration.

For 200/250V 50 Hz single phase supplies Each **£677·00** *fxN*
For 110/120V 60 Hz single phase supplies Each **£686·00** *fxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

SL-694	**Lamp,** tungsten	Each	**£2·30**	*fx*

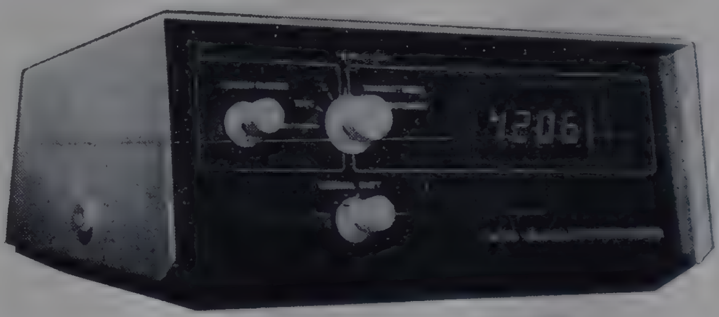
ACCESSORIES

SL-696 **Glass cells,** BS 3875 type 3, height 45 mm.

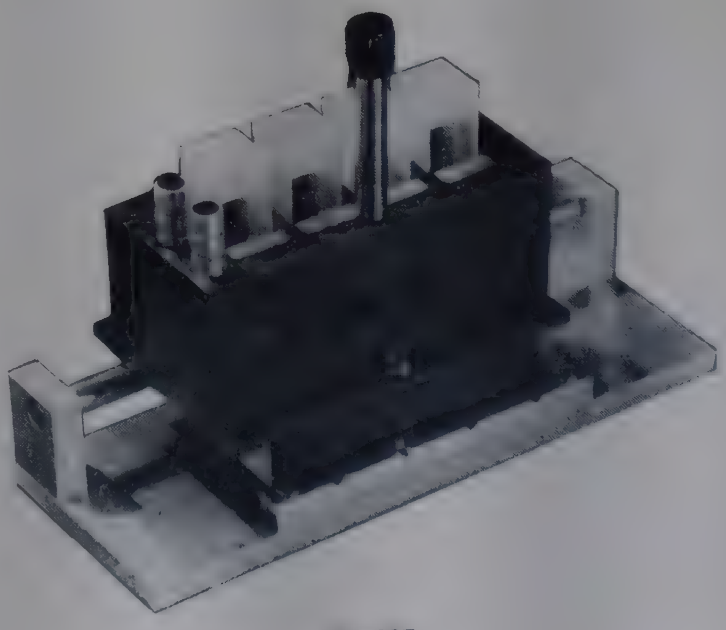
Light path	5	10	20	40 mm	
Each	**£3·70**	**2·70**	**3·70**	**4·80**	*fx*

SL-697	**Cell holder,** with water jacket, for 5 and 10 mm path length cells. For use with constant temperature water circulator	Each	**£56·50**	*fxN*
SL-698	**Microcell,** glass, 10 mm path length, must be used with SL-699	Each	**£5·00**	*fx*
SL-699	**Microcell holder,** 4-position with hinged lid.	Each	**£56·00**	*fx*
SL-701	**Manual flowcell outfit,** 10 mm ...	Each	**£37·50**	*fxN*
SL-702	**Manual flowcell outfit,** 20 mm ...	Each	**£42·50**	*fxN*
SL-703	**Manual flowcell outfit,** 40 mm ...	Each	**£47·50**	*fxN*
SL-710	**Stream analysis flowcell outfit,** 10 mm, 75 µl.	Each	**£41·00**	*fxN*
SL-714	**Test tube holder,** for 12 to 25 mm diameter test tubes up to 100 mm long	Each	**£9·80**	*fx*
SL-716	**Hinged lid,** for cell compartment ...	Each	**£12·00**	*fxN*
SL-718	**Adapter for hinged lid** SL-716 to accept 125 mm and 150 mm long test tubes	Each	**£9·80**	*fxN*
EF-680	**Potentiometric recorder,** for use with SL-680 and SL-685. For price and details see entry in List No. sequence.			
SL-719	**Adapter,** with lead to connect EF-680 to spectrophotometer	Each	**£2·75**	*fx*

SL-784	**Auto zero controller and reaction rate calculator,** for use with SL-690...	For details and prices see entries in List No. sequence.
SL-880	**Cell programme controller** ...	



Digital readout on SL-690



SL-697

CECIL CE202 SERIES GRATING SPECTROPHOTOMETERS

220 to 900 nm
and
200 to 900 nm

Versatile, single beam instruments for measurement of absorbance, transmittance and concentration in the ultraviolet and visible regions.

- High reliability and stability
- Diffraction grating monochromator
- 35 cm long wavelength scale
- Automatic stray light filter insertion
- Recorder and printer outlets
- All solid state electronics

CECIL INSTRUMENTS

SL-765

DESCRIPTION

The CE202 spectrophotometer is rapid in operation and stability is of a high order making it suitable for continuous monitoring.

The CE272 linear readout spectrophotometer has a low noise level and high energy throughput which enables it to be used with special flowcells of 30 microlitre volume and 10 mm pathlength for liquid chromotography detection. Concentration calculation and wide scale expansion facilities make this a versatile instrument. The CE230 programme control unit is particularly suited for use with this instrument for reaction kinetics.

The CE292 spectrophotometer offers essentially the same facilities as the CE272 with all results displayed in digital form.

AUTO ZERO CONTROL AND REACTION RATE ACCESSORY

Enables the absorbance zero to be automatically set by pressing a button. It also enables reaction rate measurements to be made during automatically timed periods with read-out or print-out of results.

CECIL CE202 SERIES GRATING SPECTROPHOTOMETERS

TECHNICAL DATA

Wavelength range:	220 to 900 nm
Bandwidth:	5 nm
Wavelength accuracy:	Better than 2 nm
Wavelength scale:	35 cms long set by dual ratio control giving both coarse and fine adjustment
Straylight:	Less than 0·5% at 220 nm
Straylight filter:	Automatically inserted between 290 and 390 nm
Meter readout:	Scaled in both absorbance and transmittance with antiparallax mirror
Linearity:	Better than 0·25% at accessory terminals
Absorbance zero:	Set by a single dual ratio control giving both coarse and fine adjustment
Zero drift:	Less than ±0·1% transmittance, short term (15 min)
Absorbance zero stability:	Better than ±0·001 absorbance units short term
Recorder output:	10mV full scale deflection
Printer output:	1 volt full scale deflection
Sources:	Air cooled deuterium arc and tungsten lamp selected by control knob
Sample cells:	Cells of up to 40 mm pathlength, 10 mm manual flowcell, 10 mm automatic flowcell, stream analysis flowcell

Overall dimensions:

Spectrophotometer:	54×24×38 cms
Deuterium power supply:	20×15×17 cms

Additional Technical Data for Model CE272

Wavelength range: 200–900 nm

Linear readout in concentration, absorbance and transmittance

20:1 Absorbance scale expansion in five ranges, 0–2, 0–1, 0–0·5, 0–0·2, 0–0·1A full scale.

10:1 Transmittance scale expansion

Concentration calculation—direct reading of any required concentration for samples with absorbance values between 0·1A–2·5A set by a ten turn control.

Additional Technical Data for Model CE292

Readout:	Bright co-planar seven segment display
Readout range:	−1998 to +1998
Readout resolution:	1 digit up to 1200
Concentration factor:	Set between 0 and 1 by ten turn control with display of factor
BCD output:	For digital printer
Ranges:	Concentration, concentration×10, absorbance and transmittance

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SL-760

SPECTROPHOTOMETER, *Cecil* CE202, scaled linear in transmittance and non-linear in absorbance, as specification. Wavelength range 220 to 900 nm. With deuterium and tungsten lamps, stabilised power supply for deuterium lamp, stabiliser for tungsten lamp, four position cell slide, four cell holders with 10 mm path length silica cells. Includes one each spare deuterium and tungsten lamps, spare fuses, dust cover and instructions manual. Fitted with 2·5 metres mains cable. For 110/120V, 200/210V and 220/240V 50/60 Hz single phase supplies ... ... Each **£660·00** *fx*

SL-765

SPECTROPHOTOMETER, *Cecil* CE272, as SL-760 but linear in absorbance, transmittance and concentration. Wavelength range 200 to 900 nm. For 110/120V, 200/210V and 220/240V 50/60 Hz single phase supplies. Each **£816·00** *fx*

SL-770

SPECTROPHOTOMETER, *Cecil* CE292, as SL-760 but with digital readout of absorbance, transmittance and concentration.

For 200/250V 50 Hz single phase supplies Each **£1017·00** *fxN*

For 110/120V 60 Hz single phase supplies Each **£1026·00** *fxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

SL-774 **Deuterium lamp** ... ... Each **£24·80** *fx*

SL-694 **Tungsten lamp** ... ... For price see entry in List No. sequence

ACCESSORIES

SL-776 **Silica cells,** BS 3875 type 1A, height 45 mm.

Light path	5	10	20	40 mm	
Each	**£6·60**	**6·60**	**6·70**	**8·00**	*fx*

SL-696 **Glass cells** ... ...
SL-697 **Cell holders** ... ...
For details and prices see entries in List No. sequence.

SL-777 **Microcell,** silica, 10 mm, must be used with SL-699. Each **£11·60** *fx*

SL-699 **Microcell holder.** For details and price see entry in List No. sequence.

SL-779 **Manual flowcell outfit,** 10 mm ... Each **£40·50** *fxN*

SL-781 **Manual flowcell outfit,** 20 mm ... Each **£44·30** *fxN*

SL-783 **Manual flowcell outfit,** 40 mm ... Each **£48·30** *fxN*

SL-784 **Auto zero controller** and reaction rate calculator, for use with SL-770 ... ... Each **£175·00** *fxN*

EF-680 **Potentiometric recorder,** for use with SL-760 and SL-765 ... ...
SL-719 **Adapter,** for recorder ... ...
SL-844 **Stream analysis flow cell outfit** ...
SL-880 **Cell programme controller** ...
For details and prices see entries in List No. sequence.

Digital readout SL-770 with SL-784

CECIL CE212 VARIABLE WAVELENGTH UV MONITOR

220 to 400 nm

This has a continuously variable wavelength range 220–400 nm and can be used with a wide range of flowcells. A typical flowcell used for general monitoring has a 75 μl volume and 10 mm pathlength. For high resolution liquid chromatography, special cells of 10 μl and 30 μl capacity with a 10 mm pathlength are available. These are accurately located in the beam by means of a micrometer adjustment cell holder. Eight linear absorbance ranges are provided from 0–2 to 0–0·01A full scale, making full use of the high stability and low noise level.

Wavelength accuracy:	Better than 2 nm
Stray light:	0·5% at 220 nm
Linear absorbance ranges:	Eight from 0 to 2 to 0 to 0·01A
Linear transmission ranges:	0 to 100% and 0 to 10%
Zero stability:	±0·1%
Absorbance zero stability:	±0·001 per hour after warm up
Output:	1V or 10mV linear in A or T
Noise level:	±0·0002 Absorbance units

SL-840

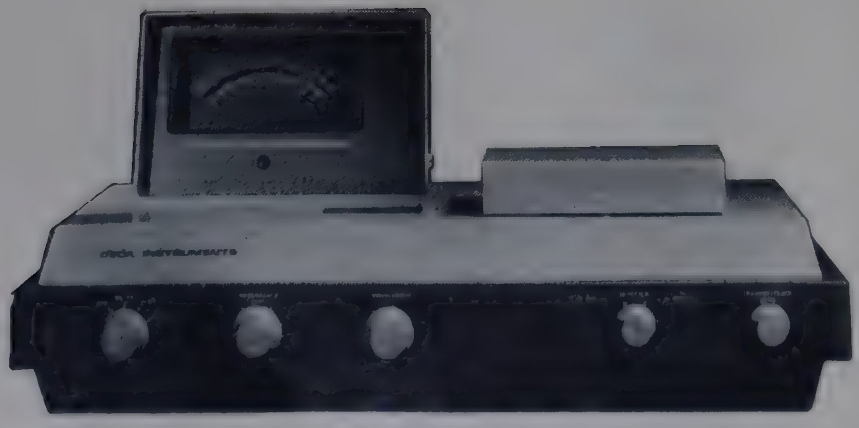
VARIABLE WAVELENGTH UV MONITOR, *Cecil* CE212, range 220 to 400 nm, as specification. With deuterium lamp, stabilised supply for deuterium lamp, hinged lid for cell compartment, instructions manual, fitted with 2·5 metres mains cable (but without cells or holder). For 110/120V, 200/210V and 220/240V 50/60 Hz single phase supplies ... ... Each **£713·00** *fxN*

REPLACEMENT PART

SL-842	**Deuterium lamp**	Each **£34·80** *fxN*

ACCESSORIES

SL-844	**Stream analysis flow cell outfit,** silica, 10 mm, 75 μl	Each **£51·50** *fxN*
SL-845	**Continuous flow cell outfit,** silica, 10 mm, 30 μl, for liquid chromatography	Each **£71·50** *fxN*
SL-846	**Continuous flow cell outfit,** silica, 10 mm, 10 μl, for liquid chromatography	Each **£71·50** *fxN*



SL-860

CECIL CE343 SINGLE SAMPLE SPECTROPHOTOMETER

325 to 1000 nm

A low cost 10 nm bandwidth spectrophotometer for near UV and visible region. Ideal for teaching, plant laboratories and clinical use. The standard instrument accepts test tubes 12 to 25 mm diameter up to 100 m long. For use with rectangular cells accessory SL-868 must be fitted. The large meter is scaled both in absorbance and transmittance with provision for connection to recorder or printer.

Wavelength accuracy:	Better than 2 nm
Stray light:	1% at 340 nm
Zero stability:	±0·1% short term
Absorbance stability:	±0·002A
Scaled:	0 to 100% T and 0 to 2A
Sample volume:	2 ml in 12 mm test tube

SL-860

SINGLE SAMPLE SPECTROPHOTOMETER, *Cecil* CE343, range 325 to 1000 nm, as specification. With tungsten lamp and stabiliser, cell compartment, hinged lid, universal test tube holder, stray light filter, blue and red sensitive photocells, 2·5 metres mains cable and instructions manual. For 110/120V, 200/210V and 220/240V 50/60 Hz single phase supplies. Each **£285·00** *fx*

REPLACEMENT PART

SL-694	**Lamp,** tungsten. For price see entry in List No. sequence.

ACCESSORIES

SL-696	**Glass cells.** For price see entry in List No. sequence.	
SL-868	**Single cell holder,** for SL-696 ...	Each **£9·80** *fx*
SL-716	**Hinged lid,** for cell compartment ...	For details and prices see entries in List No. sequence.
SL-718	**Adapter,** for hinged lid	
EF-680	**Potentiometric recorder**	
SL-719	**Adapter,** for recorder	

CECIL CE230 CELL PROGRAMME CONTROLLER AND CELL CHANGER

An accessory for use with any of the spectrophotometers of the CE303 or CE202 series **with the exception of the CE343,** whereby up to four 10 mm pathlength cells may be introduced sequentially into the light beam for studies into reaction kinetics. The instrument has four operational modes, viz: manual, single cycle, repetitive cycle with delay up to 15 minutes. Liquid from a thermostatically controlled source may be passed through the cell holder to keep the cells at constant temperature.

The cell changer must be factory installed.

SL-880

CELL PROGRAMME CONTROLLER, *Cecil* CE230, as specification. Includes four position cell changer, cell programme controller, four position cell holder, cell compartment hinged lid, link mechanism to drive cell holder.

For 230/250V 50 Hz single phase supplies	Each **£259·00** *fxN*
For 200/220V 50 Hz single phase supplies	Each **£269·00** *fxN*
For 110/120V 60 Hz single phase supplies	Each **£274·00** *fxN*

BURETTE AND FUNNEL STANDS

SINGLE STAND WITH HARDWOOD HOLDERS

SM-210
STAND, hardwood, single, with base 20×12·5 cm and vertical rod 46×2 cm to take burette holder SM-212 or funnel holder SM-214 Ten **£6·20** Each **£0·70** *cx*

SM-212
BURETTE HOLDER, hardwood, for one burette. Ten **£7·20** Each **£0·80** *cx*

SM-214
FUNNEL HOLDER, hardwood, for one funnel up to 12 cm diameter ... ... Ten **£5·80** Each **£0·64** *cx*

SM-214

SM-210
whit SM-212

DOUBLE STANDS WITH HARDWOOD HOLDERS

SM-230
STAND, hardwood, double, with base 28×12·5 cm and vertical rod 46×2 cm to take burette holder SM-242, burette/funnel holder SM-243 or funnel holder SM-244. Ten **£7·20** Each **£0·80** *cx*

SM-241
STAND, as SM-230 with hardwood rod, but with stoved white epoxide resin finished cast iron base 29×14 cm. Ten **£22·00** Each **£2·45** *cx*

SM-242
BURETTE HOLDER, hardwood, for two burettes. Ten **£8·40** Each **£0·94** *cx*

SM-243
BURETTE/FUNNEL HOLDER, hardwood, for one burette and one funnel up to 12 cm diameter. Ten **£8·00** Each **£0·88** *cx*

SM-244
FUNNEL HOLDER, hardwood, for two funnels up to 12 cm diameter ... ... Ten **£7·00** Each **£0·78** *cx*

SM-242

SM-243

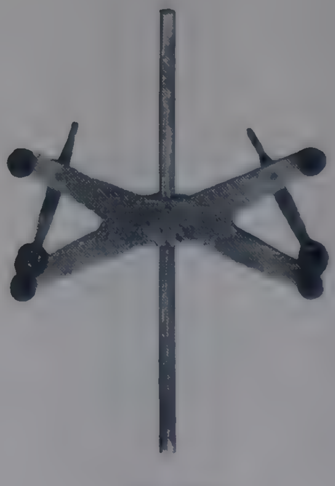
DOUBLE STAND AND BURETTE HOLDER

SM-434
STAND, double. Stoved white finished cast iron. For details and price see entry in List No. sequence.

SM-290
BURETTE HOLDER, *Gallenkamp*, for two burettes, providing a positive grip and release. The burettes are held firmly in rubber lined jaws without obscuring the graduations. The offset mounting of the spring loaded clamp arms prevents downward motion through the clamp. A single thumb screw secures the clamp to rods of nominal 13 mm dia. which may be vertical or horizontal. Finished in white enamel ... Ten **£21·50** Each **£2·40** *bx*

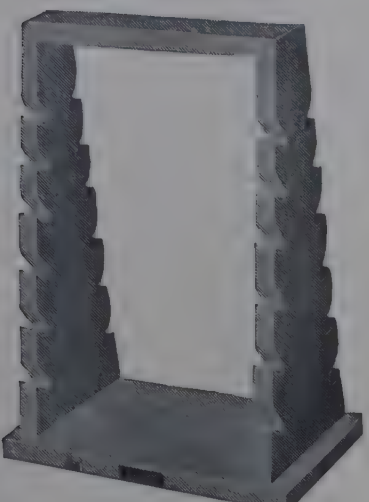
REPLACEMENT PART
SM-293 **Rubber cushions.** In pack of 10. Ten packs **£1·60** Pack **£0·23** *bx*

SM-230
with SM-244

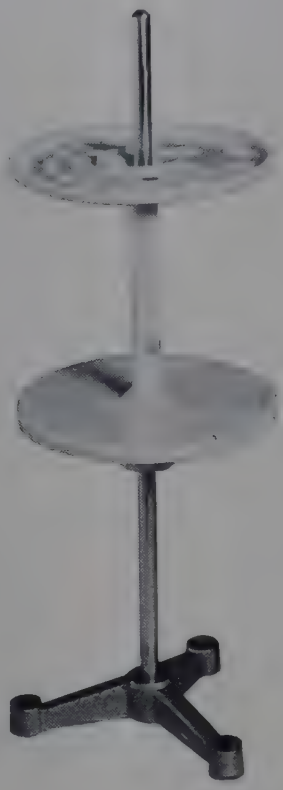

SM-290
with rod

BURETTE STANDS for burettes mounted on 500 ml reservoir bottles see BW-880 and BW-881 in List No. sequence.

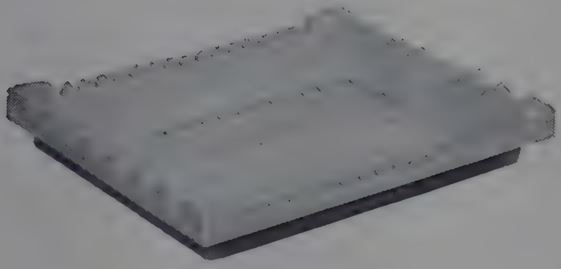
PIPETTE STANDS



SM-310



SM-331



SM-335

SM-310

PIPETTE STAND, hardwood, to hold twelve pipettes horizontally, six on either side.
Ten **£13·60** Each **£1·50** *cx*

SM-331

PIPETTE STAND, to hold 28 pipettes vertically. Comprises polypropylene support, cadmium plated rod and iron tripod base. The height of the support on the rod is adjustable ... ... Ten **£60·00** Each **£6·60** *cx*

***SM-335**

PIPETTE SUPPORT TRAY, PVC, 28×21×2 cm deep. With corrugated rim and off-centre support for short pipettes ... ... Each **£1·50** *mx*
For the general properties of PVC see page 542.

PIPETTE RACKS, wall fixing see FX-546 and FX-547 in List No. sequence.

Gallenkamp LABORATORY JACK

REGD TRADE MARK

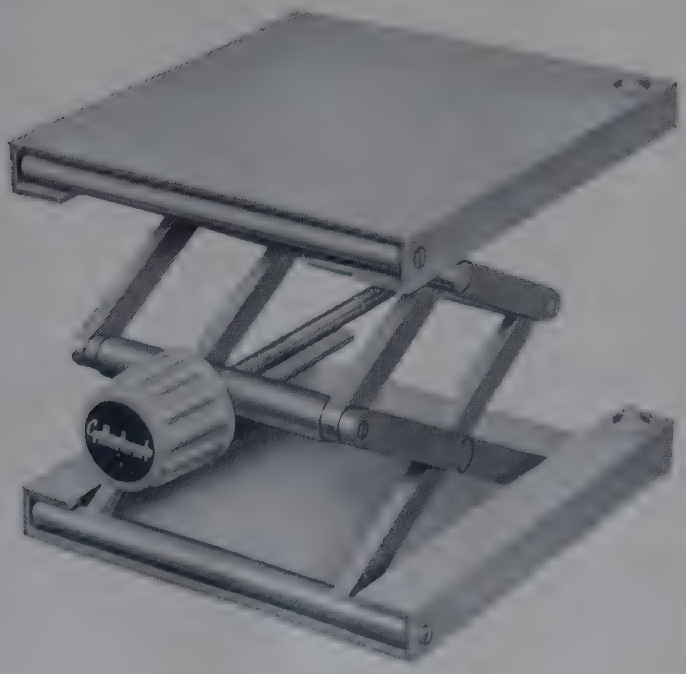
(Patent Applied For)

- **Smooth raising and lowering mechanism**
- **Negligible tendency for top plate to tilt**
- **Two useful alternative methods of mounting support rod**
- **Rigid in all positions without the use of clamping screws**

The laboratory jack has many uses for raising and lowering equipment with smooth precise control. It also provides a variable height platform for apparatus even when the raising and lowering facility is not required.

The jack is constructed mainly of aluminium alloy; all rivets are rustproofed and the lifting screw is stainless steel. A large plastics knob operates the scissor-action lifting mechanism.
Either plate can be used as the base and both plates are drilled to accept a 13 mm dia. support rod. **The rod mounting system allows the support rod either to remain stationary with respect to the bench or to move up and down with the top plate.**

Minimum height of top plate	5 cm from bench
Maximum height of top plate	27 cm from bench
Maximum load	25 kg between heights 10 and 27 cm 10 kg between heights 5 and 10 cm
Plate dimensions	17×16 cm



SM-360

SM-360

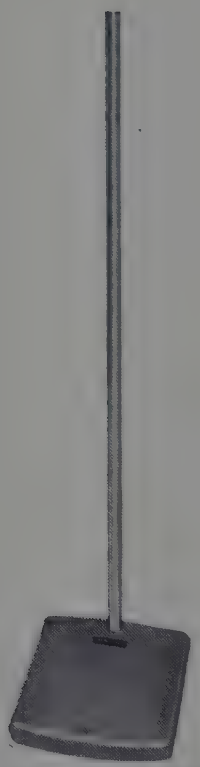
LABORATORY JACK, *Gallenkamp*, as specification, with scissor action mechanism, drilled plates and components for mounting a 13 mm support rod as listed below.
Without support rod. Ten **£78·00** Each **£8·60** *bx*

ACCESSORIES

SM-450	**Support rods,** plated mild steel, 13 mm dia. with threaded ends. Sizes C, D and E.	For details and prices see entries in List No. sequence.
SM-452	**Support rods,** stainless steel, 13 mm dia., with threaded ends. Sizes C, D and E.	
SM-454	**Support rods,** aluminium alloy, 13 mm dia. with threaded ends. Sizes A to E ...	

RETORT STANDS

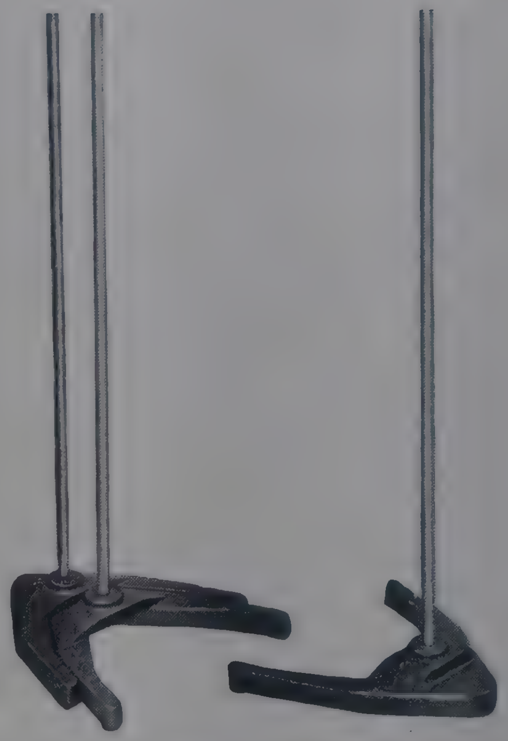
(Dimensions and weights given below are nominal)



SM-430 or SM-432 with rod

SM-434 with rod

SM-436 with rod



SM-438 with rod

BASES

Threaded M10×1·5

SM-430
RETORT STAND BASES, rectangular, cast iron, finished in stoved grey enamel.

Size	A	B	C	D	E	
Length	15	18	22	25	30 cm	
Width	10	12	14	17	20 cm	
Weight	1	1·4	1·7	2·5	3·5 kg	
Ten	**£6·20**	**7·80**	**9·40**	**13·20**	**16·50**	cx
Each	**£0·66**	**0·70**	**1·04**	**1·45**	**1·85**	

SM-432
RETORT STAND BASES, rectangular, stoved white resin finished cast iron, otherwise as SM-430.

Size	A	B	C	D	E	
Ten	**£7·20**	**9·40**	**11·20**	**15·50**	**19·50**	cx
Each	**£0·80**	**1·04**	**1·25**	**1·70**	**2·15**	

SM-434
RETORT or BURETTE STAND BASE, double. White resin finished, rectangular cast iron with central hole ... ... Ten **£16·50** Each **£1·85** cx

SM-436
RETORT STAND BASES, tripod shape stoved grey enamel cast iron, with rubber feet.

Size	A	C	E	
Spread of feet from centre	9	12·5	18 cm	
Weight	1·4	1·6	3 kg	
Ten	**£8·60**	**13·40**	**19·00**	cx
Each	**£0·96**	**1·50**	**2·10**	

SM-438
RETORT STAND BASES, nesting pattern. 'Inset dia.' indicates the largest diameter of circular article which can be placed between the feet.

Size	C	E	
Width	18	23 cm	
Depth	20	26 cm	
Inset dia.	15	21 cm	
Weight	1·5	3 kg	
Ten	**£9·00**	**15·00**	cx
Each	**£1·00**	**1·65**	

RODS

Threaded M10×1·5

SM-450
RETORT STAND RODS, cadmium plated mild steel

Size	A	B	C	D	E	
Length	45	53	60	75	90 cm	
Diameter	10	10	13	13	13 mm	
Ten	**£3·10**	**3·60**	**4·70**	**5·60**	**6·60**	cx
Each	**£0·37**	**0·42**	**0·52**	**0·62**	**0·74**	

SM-452
RETORT STAND RODS, bright stainless steel

Size	A	B	C	D	E	
Length	45	53	60	75	90 cm	
Diameter	10	10	13	13	13 mm	
Ten	**£8·80**	**9·60**	**18·00**	**22·50**	**27·50**	cx
Each	**£0·98**	**1·06**	**2·00**	**2·50**	**3·10**	

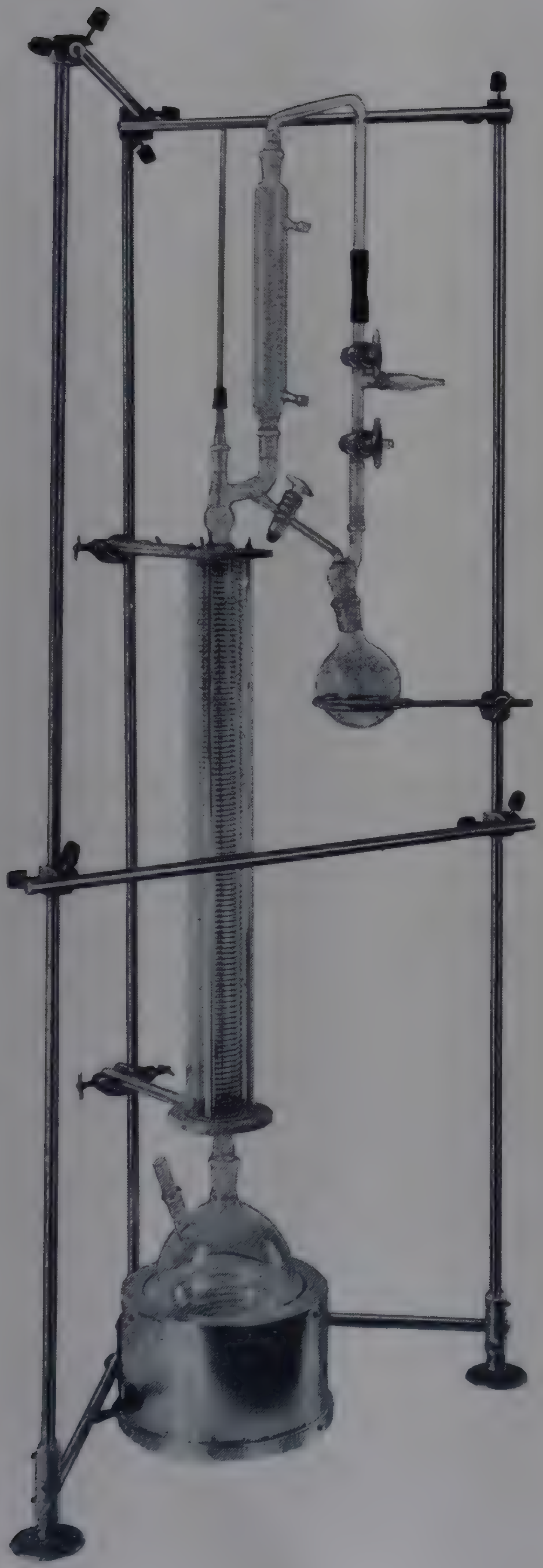
SM-454
RETORT STAND RODS, bright aluminium alloy

Size	A	B	C	D	E	
Length	45	53	60	75	90 cm	
Diameter	13	13	13	13	13 mm	
Ten	**£4·50**	**4·90**	**5·80**	**6·80**	**7·20**	
Each	**£0·50**	**0·55**	**0·64**	**0·76**	**0·80**	cx

ROD and TUBING, aluminium alloy, 13 mm dia., unthreaded—see SM-564 and SM-572 in List No. sequence.

Gallenkamp LABLOX SCAFFOLDING

A series of versatile components for assembling rigid scaffolding supports for laboratory and pilot plant use.



- Light weight, strong, rigid scaffolding easily assembled using rods or tubing
- Infinite variety of assembly shapes and dimensions
- Floor, bench and wall mounting facilities
- Components are precision diecast aluminium or zinc based alloy
- Simple thumb screw or socket headed screw fixing
- Versatile swivels and connectors for difficult mountings
- Connectors accept rod and tubing from 6 to 13 mm dia. and standard retort clamps
- Skew orientation of individual rods or tubes easily achieved
- Flexible tubings and wires kept neatly in place by clipping along rods or run through tubes
- Connectors and brackets available for mounting instruments or brackets directly on scaffolding

Typical assemblies are shown on the facing page. For details and prices of components see entries on pages 632/633.

Gallenkamp LABLOX SCAFFOLDING ASSEMBLIES

REGD TRADE MARK

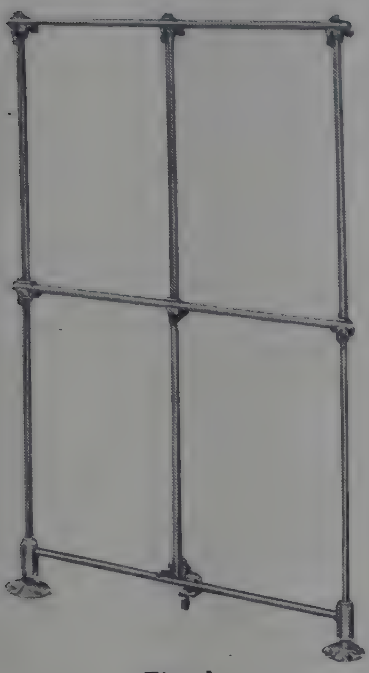


Fig. 1

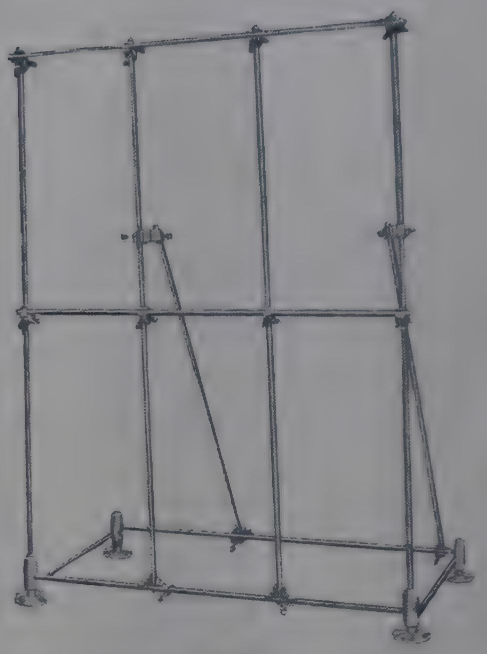


Fig. 2

Fig. 1

6 Connectors, 2-way ...	**SM-480**
1 Swivel connector, plane	**SM-504**
3 Rods 60 cm	**SM-564**
3 Rods 90 cm	**SM-564**
2 Feet	**SM-510**
2 Adapters	**SM-518**

Wood screws SM-516 also required

Fig. 2

10 Connectors, 2-way ...	**SM-480**
2 Swivel connectors, 2-way	**SM-500**
2 Swivel connectors, plane	**SM-504**
2 Rods 40 cm	**SM-564**
6 Rods 90 cm	**SM-564**
4 Rods 120 cm	**SM-564**
4 Feet	**SM-510**
4 Adapters	**SM-518**

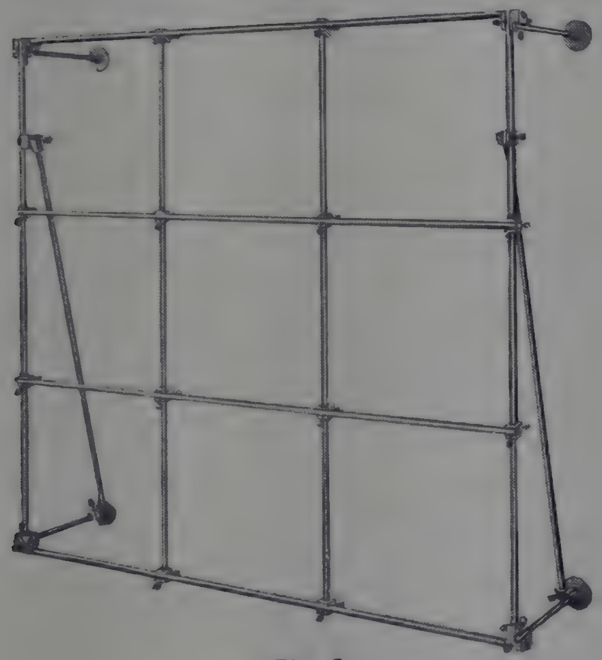


Fig. 3

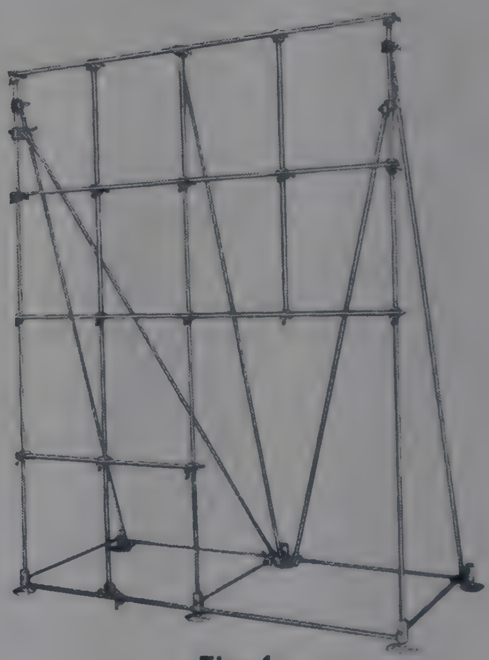


Fig. 4

Fig. 3

12 Connectors, 2-way ...	**SM-480**
4 Connectors, 3-way ...	**SM-490**
4 Swivel connectors, 2-way	**SM-500**
4 Rods 40 cm	**SM-564**
2 Rods 90 cm	**SM-564**
8 Rods 120 cm	**SM-564**
4 Feet	**SM-510**

Wood screws SM-516 also required

Fig. 4

18 Connectors, 2-way ...	**SM-480**
10 Swivel connectors, 2-way	**SM-500**
1 Swivel connector, plane	**SM-504**
4 Rods 60 cm	**SM-564**
1 Rod 90 cm	**SM-564**
5 Rods 120 cm	**SM-564**
9 Rods 180 cm	**SM-564**
6 Feet	**SM-510**
6 Adapters	**SM-518**

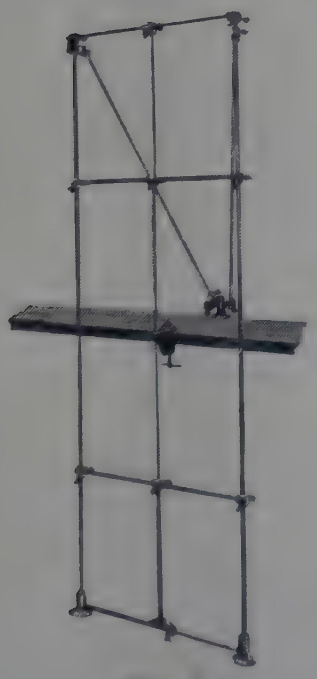


Fig. 5

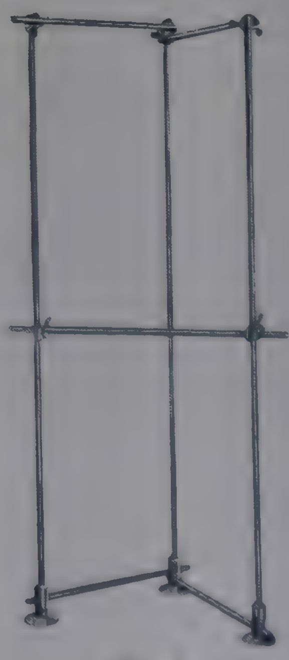


Fig. 6

Fig. 5

9 Connectors, 2-way ...	**SM-480**
4 Swivel connectors, 2-way	**SM-500**
1 Swivel connector, plane	**SM-504**
1 Clamp	**SM-526**
1 Rod 10 cm	**SM-564**
4 Rods 60 cm	**SM-564**
2 Rods 90 cm	**SM-564**
3 Rods 180 cm	**SM-564**
3 Feet	**SM-510**
3 Adapters	**SM-518**

Wood screws SM-516 also required

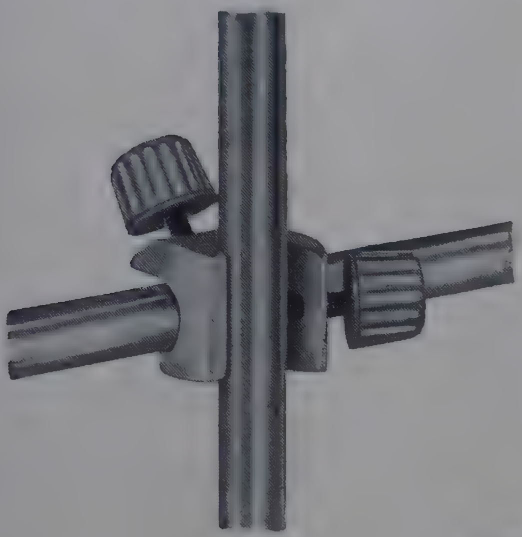
Fig. 6

4 Connectors, 2-way ...	**SM-480**
1 Connector, 3-way ...	**SM-490**
4 Rods 40 cm	**SM-564**
1 Rod 60 cm	**SM-564**
3 Rods 120 cm	**SM-564**
3 Feet	**SM-510**
3 Adapters	**SM-518**

For details and prices of components see overleaf.

Gallenkamp LABLOX SCAFFOLDING COMPONENTS

REGD TRADE MARK


SM-480

SM-480

CONNECTOR, 2-way, *Lablox,* diecast aluminium alloy with thumb screws for hand tightening. Used for fixing two rods or tubes at right angles to each other. Accepts rod or tubing from 6 mm to 13 mm dia.

Ten **£1·85** Each **£0·25** *bx*

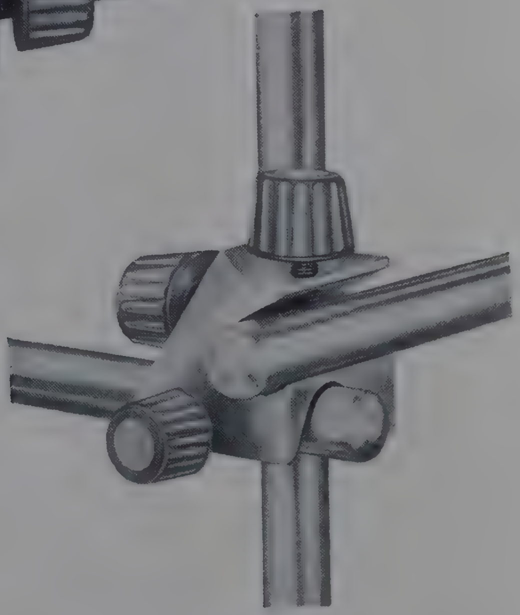
ACCESSORIES

SM-484 **Screws, socket headed** to replace thumb screws. Suitable for use with rod or tubing of 13 mm dia., In pack of 10 ... Ten packs **£1·75** Pack **£0·24** *bx*

SM-486 **Screws, socket headed,** as SM-484 but for use with rod or tubing of 6 mm dia. In packs of 10. Ten packs **£2·30** Pack **£0·29** *bx*

SM-488 **Socket wrench 2·5 mm A/F,** for tightening SM-484 and SM-486. In pack of 10. Ten packs **£2·50** Pack **£0·31** *bx*

SM-506 **Swivel adapter.** For details and prices see entry in List No. sequence.


SM-490

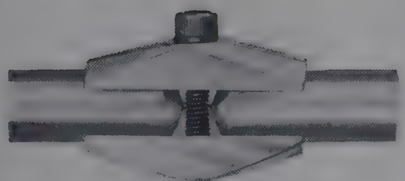
SM-490

CONNECTOR, 3-way, *Lablox,* as SM-480 but for fixing three rods or tubes mutually at right angles. Accepts rod or tubing from 6 mm to 13 mm dia.

Ten **£3·20** Each **£0·38** *bx*

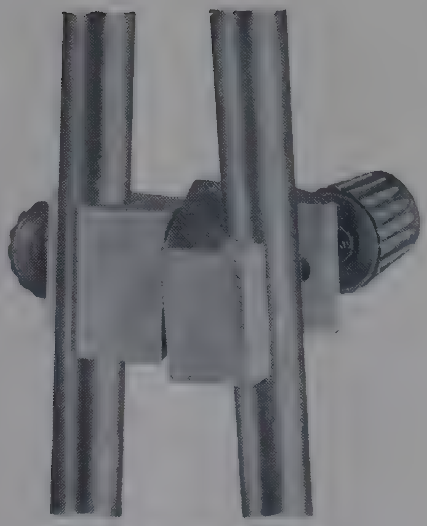
ACCESSORIES

SM-484 **Screws, socket headed** ...
SM-486 **Screws, socket headed** ...
SM-488 **Socket wrench** ... ...
For details and prices see entries in List No. sequence.


SM-494

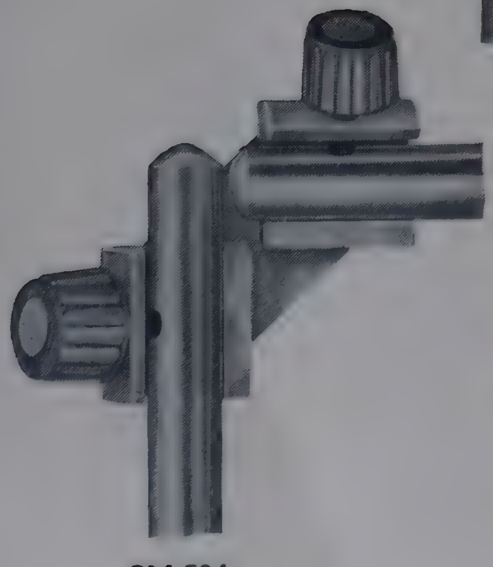
SM-494

CONNECTOR, in-line, *Lablox,* diecast aluminium alloy with socket headed screw. For butt-joining two lengths of rod or tube end-to-end. Accepts rod or tubing from 6 mm to 13 mm dia. Includes one 4 mm A/F socket wrench ... ... Ten **£2·20** Each **£0·28** *bx*


SM-500

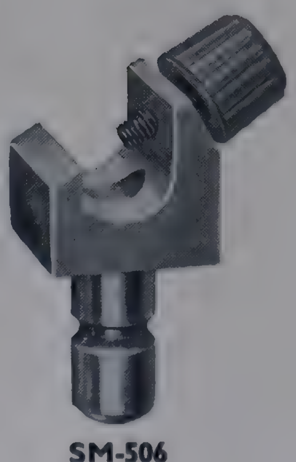
SM-500

CONNECTOR, swivel, 2-way, *Lablox,* diecast aluminium alloy, with thumb screws for hand tightening. For holding two rods or tubes at any angle to each other. The two components are restrained from swivelling freely by an intermediate tension washer. Accepts rod or tubing from 6 mm to 13 mm dia. Ten **£3·40** Each **£0·40** *bx*


SM-504

SM-504

CONNECTOR, plane swivel, *Lablox,* diecast aluminium alloy, with steel strap, with thumb screws for hand tightening. For connecting two rods or tubes which converge at any angle. Suitable for making triangular or square frames for supporting large flanged items such as heating mantles, funnels, etc. Accepts rod or tubing from 6 mm to 13 mm dia. Ten **£4·20** Each **£0·47** *bx*


SM-506

SM-506

ADAPTER, swivel, *Lablox,* diecast aluminium alloy, with thumb screw for hand tightening. Enables connector SM-480 to be used as swivel connector which can be clamped at any required angle for various applications including diagonal bracing.

Ten **£2·75** Each **£0·34** *bx*

ACCESSORIES FOR SM-500, SM-504 AND SM-506

SM-484 **Screws, socket headed** ...
SM-486 **Screws, socket headed** ...
SM-488 **Socket wrench** ... ...
For details and prices see entries in List No. sequence.

Gallenkamp LABLOX SCAFFOLDING COMPONENTS

SM-510
FOOT, *Lablox*, diecast aluminium alloy, with 3 countersunk holes for screwing foot to bench, floor or wall, and socket-headed screw fixing for rod or tubing of 13 mm dia. Requires SM-488 wrench for tightening. Each pack of 10 includes one wrench Ten **£1·80** Each **£0·25** *bx*

SM-514
FOOT, *Lablox*, diecast zinc alloy with two slotted holes for bolting to Dexion or other types of slotted angle frames, and socket headed screw fixing for rod or tubing of 13 mm dia. Requires SM-488 wrench for tightening. Each pack of 10 includes one wrench.
Ten **£3·00** Each **£0·36** *bx*

ACCESSORIES FOR SM-510 AND SM-514

SM-516 **Wood screws,** stainless steel, length 20 mm. For use with SM-510. In pack of 12. Ten packs **£2·50** Pack **£0·31** *bx*
SM-486 **Screw, socket headed** } For details and prices see entries in List No. sequence.
SM-488 **Socket wrench** ... ... }

SM-518
FOOT ADAPTER, *Lablox*, aluminium alloy, with boss to fit feet SM-510 and SM-514. Accepts three 13 mm dia. rods or tubes mutually at right angles, of which two are perpendicular to the boss and the third is in line with the boss. With socket head screw fixings for rods or tubing. Requires SM-488 wrench for tightening. Each pack of 10 adapters includes one wrench.
Ten **£4·30** Each **£0·48** *bx*

ACCESSORIES

SM-486 **Screws, socket headed** ... } For details and prices see entries in List No. sequence.
SM-488 **Socket wrench** ... ... }

SM-526
CLAMP, G, *Lablox*, enamelled cast iron, for clamping to edge of bench. With socket headed screw fixing for rod or tubing of 13 mm dia. Includes one SM-488 wrench for tightening ... ... Each **£2·40** *bx*

SM-532
CONNECTOR, accessory, *Lablox*, diecast aluminium alloy, with thumb screw for hand tightening. With two holes for fixing instrument cases control panels, brackets, safety screens, etc. to scaffold framework by means of two self-tapping screws supplied. A central 6 mm dia. fixing hole is also provided. Can be mounted on rod or tubing from 6 mm to 13 mm dia. Ten **£1·90** Each **£0·25** *bx*

ACCESSORIES

SM-534 **Bracket,** for fixing to SM-532. Can be assembled for horizontal or vertical fixing. With drilled holes 2 cm apart ... ... Ten **£0·60** Each **£0·13** *bx*
SM-484 **Screws, socket headed** ... } For details and prices see entries in List No. sequence.
SM-486 **Screws, socket headed** ... }
SM-488 **Socket wrench** ... ... }

SM-564
RODS, *Lablox*, aluminium alloy, 13 mm dia. approx.

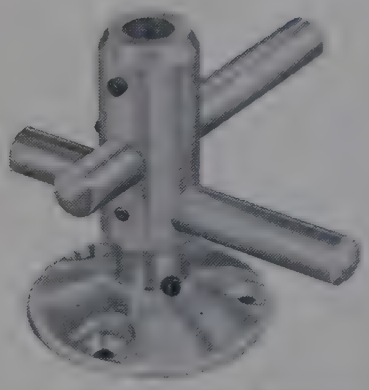
Length	10	20	40	60	90	120	180 cm	
Ten	**£1·20**	**1·85**	**2·80**	**3·40**	**4·70**	**6·20**	**9·80**	*bx*
Each	**£0·19**	**0·25**	**0·34**	**0·40**	**0·52**	**0·70**	**1·10**	

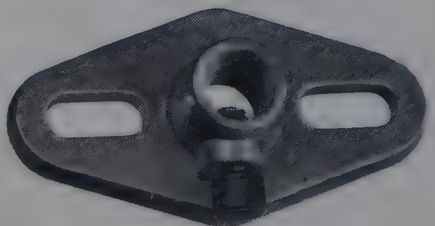
SM-572
TUBING, *Lablox*, aluminium alloy, 13 mm dia. approx. without end plugs.

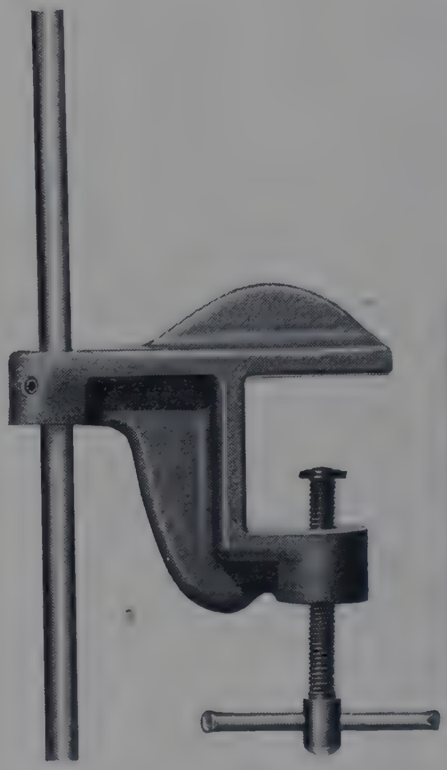
Length	100	200 cm	
Each	**£0·40**	**0·75**	*bx*

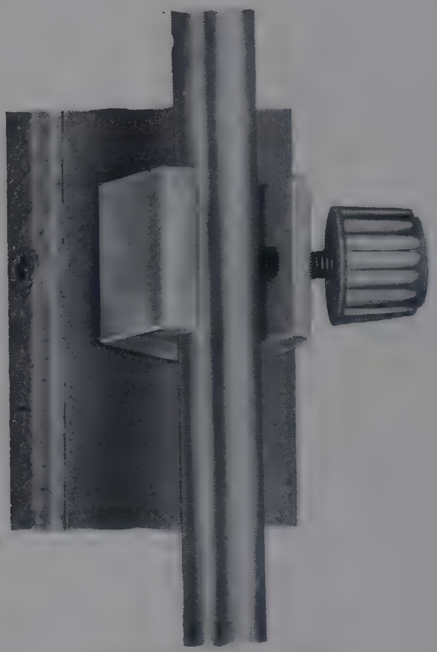
ACCESSORIES

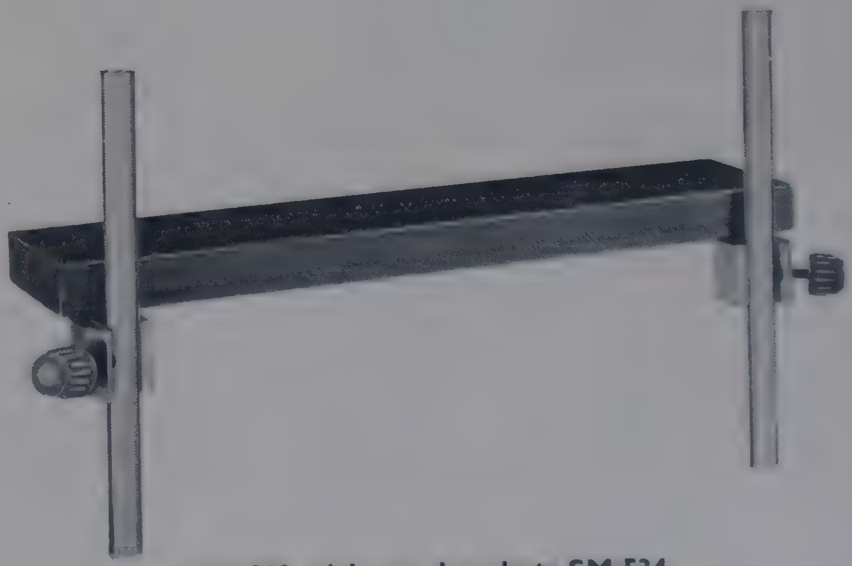
SM-574 **Tubing cutter** ... ... Each **£1·08** *mx*
SM-576 **End plugs,** nylon, for closing off the ends of lengths of tubing SM-572. In pack of 10. 10 packs **£1·60** Pack **£0·23** *bx*


SM-510 with SM-518


SM-514


SM-526


SM-532 supporting instrument case

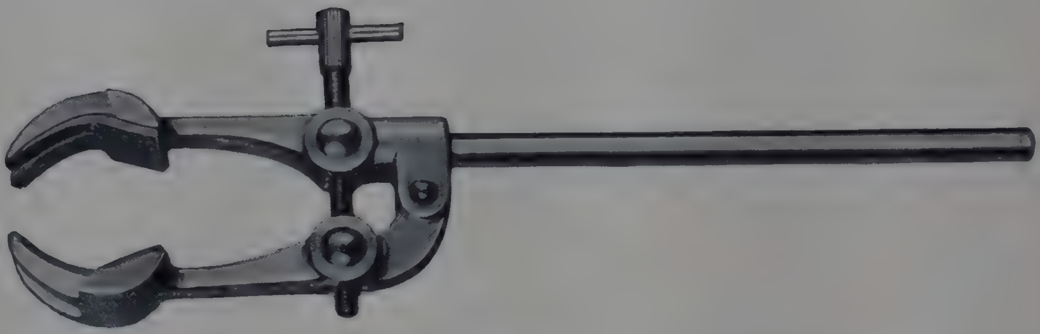

SM-532 with two brackets SM-534 supporting shelf on frame

Technico CLAMP AND BOSSHEAD

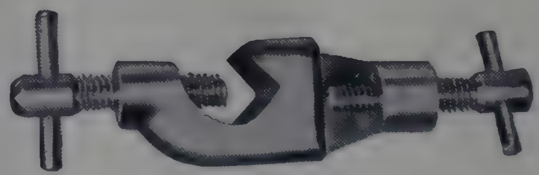
REGD. TRADE MARK

- **No iron parts to rust**
- **Clamp accepts articles between 2 mm and 90 mm diameter**
- **Well secured cork jaw-liners**
- **Bosshead takes rods up to 16 mm dia. in each jaw**

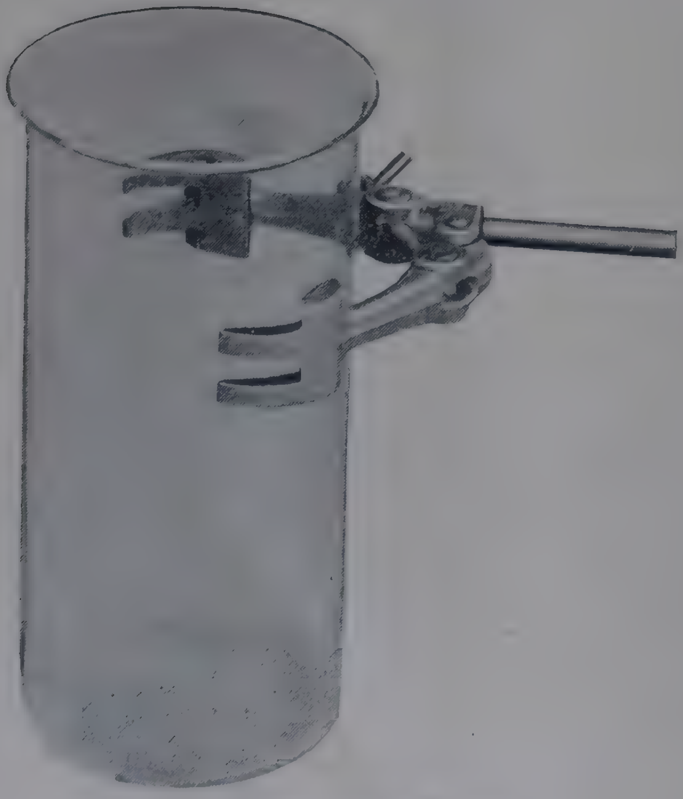
SM-600 extended 6 mm



SM-600



SM-610



SM-600 extended 90 mm

SM-600

CLAMP, RETORT STAND, *Technico*, enables articles between 2 mm and 90 mm diameter to be securely clamped. Comprises light alloy pressure diecastings with other parts of nickel plated brass. The design of the jaw ensures a firm grip at all angles of opening. The cork liners for the jaws are well secured. With 8 mm diameter rod suitable for use in bossheads SM-610, SM-636 and SM-638.

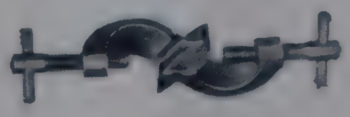
Ten **£7·80** Each **£0·86** *bx*

SM-610

BOSSHEAD, *Technico*, Regd. Design No. 860962, with offset jaws for great strength. Comprises a light alloy pressure diecasting with clamping screws of nickel plated brass. The vee-grooves in the body are true and give a firm grip in either jaw on rods up to 16 mm diameter.

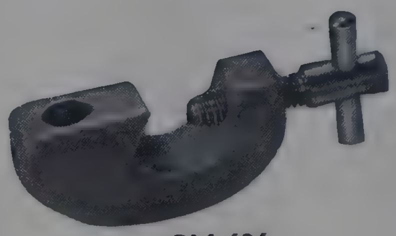
Ten **£4·50** Each **£0·50** *bx*

BOSSHEADS


SM-630

SM-630

BOSSHEAD, aluminium alloy, accepts rods up to 19 mm in both jaws ... ... Ten **£7·00** Each **£0·78** *cx*

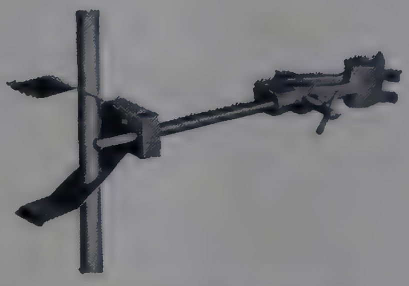

SM-636

SM-636

BOSSHEAD, aluminium alloy, to take range of clamps and support plates SM-600 and SM-668 to SM-695 and rings SM-710 and SM-720. The jaw accepts rod up to 16 mm diameter and the bosshead is drilled to take 6 to 8 mm diameter rod, secured by a socket headed screw at right angles to the support rod. Ten **£4·20** Each **£0·47** *bx*

ACCESSORY

SM-488 **Wrench,** for socket headed screws. For price see entry in List No. sequence.


SM-638 with SM-600

SM-638

BOSSHEAD, quick release, with stainless steel leaf spring clamp which grips a 13 mm diameter support rod. When the spring clamp is held under finger pressure its grip is released and the position of the bosshead on the support rod may easily be altered. The bosshead accepts SM-600, SM-668 to SM-695, SM-710, SM-720 and any 6 to 8 mm dia. rod at right angles to the support rod, secured by a socket-head screw. Ten **£14·00** Each **£1·55** *bx*

ACCESSORY

SM-488 **Wrench,** for socket headed screws. For price see entry in List No. sequence.

SM-480 2-way connector, *Lablox*, for fixing two rods or tubes at right angles to each other.

SM-490 3-way connector, *Lablox*, for fixing three rods or tubes mutually at right angles.

For details and prices of above and also *Lablox* in-line and swivel connectors, see entries in List No. sequence.

CLAMPS

SM-640

SM-640

CLAMP, for beakers up to 5 litres, cadmium plated iron, with asbestos covered rod jaws, opening up to 180 mm max. The 9·5 mm dia. horizontal support rod is offset so that large vessels are secured in line with the axis of the vertical support rod. Each **£2·80** *cx*

SM-645

SM-645

CLAMP, for *Quickfit* **reaction vessels** having wide necks and flat flange joints. The cadmium plated iron clamp has asbestos fabric covered jaws and is supplied with two interchangeable offset support rods. One rod is used with vessels up to 5 litres and the other with 10 and 20 litre reaction vessels. Maximum jaw opening 180 mm. The 9·5 mm dia. rods are secured by socket headed screws for which a wrench is provided ... ... Each **£2·80** *cx*

SM-668

SM-668

CLAMP, semi-micro, stainless steel, with three-pronged rubber sleeved jaws, and 6 mm diameter rod. The sliding hinge permits the clamp to grip apparatus up to 40 mm diameter ... Ten **£24·00** Each **£2·65** *cx*

For spring pattern Semi-Micro Clamp see SM-685 in List No. sequence.

CLAMPS

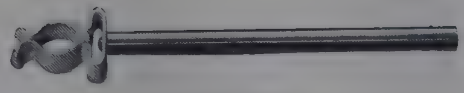
(continued)

SM-670

SM-670

CLAMPS, SPRING, for supporting condensers etc., with 11·5 cm long rod, 8 mm diameter, to fit bossheads SM-610, SM-636 and SM-638.

Clamp diameter	20	35	40 mm	
Ten	**£3·60**	**4·20**	**4·20**	*bx*
Each	**£0·42**	**0·47**	**0·47**	

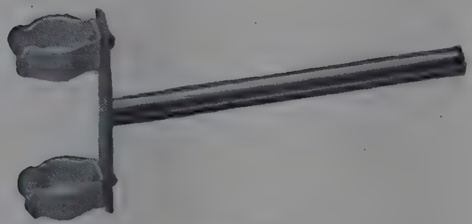


SM-680

SM-680

CLAMPS, SPRING, for supporting semi-micro apparatus and glass tubing. Comprises polythene coated spring clip attached to 11·5 cm long rod, 8 mm diameter, to fit bossheads SM-610, SM-636 and SM-638.

Clip size	7	13	20 mm	
Ten	**£2·35**	**2·90**	**2·90**	*bx*
Each	**£0·30**	**0·35**	**0·35**	

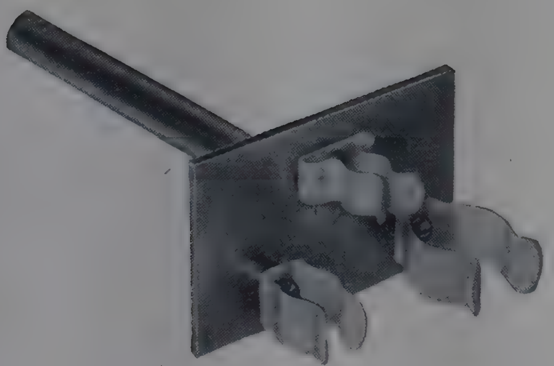


SM-682

SM-682

CLAMPS, SPRING, for supporting burettes. Comprises two polythene coated spring clips 5 cm apart on a plate attached to a 15 cm long rod, 8 mm diameter, to fit bossheads SM-610, SM-636 and SM-638.

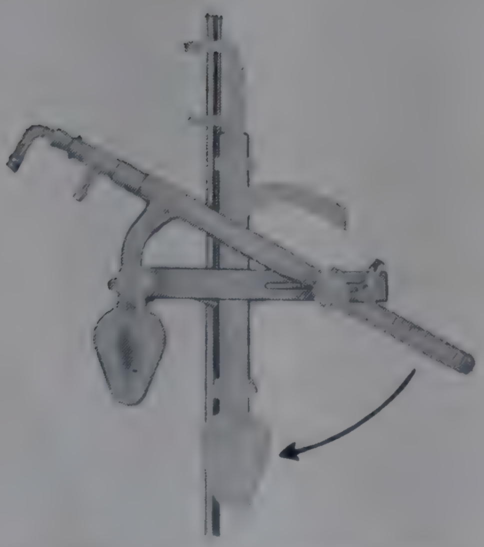
Clip size	6	10	13 mm	
For burettes	1 and 2	5 and 10	25 and 50 cm^3	
Ten	**£4·70**	**5·20**	**5·70**	*bx*
Each	**£0·52**	**0·58**	**0·64**	



SM-683

SM-683

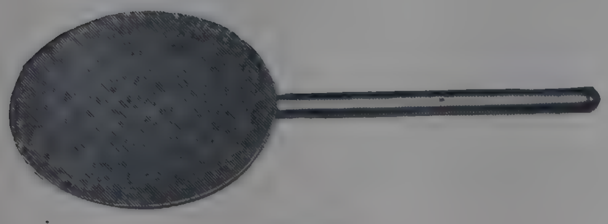
CLAMP, SPRING, for supporting two electrodes and a thermometer or other groups of similar glass apparatus of small diameters. Comprises one each polythene coated spring clips, 6, 10 and 13 mm diameter mounted 15 mm apart on a plate attached to a rod 15 cm long, 8 mm dia., to fit bossheads SM-610, SM-636 and SM-638.
Ten **£5·40** Each **£0·60** *bx*



SM-685 in use illustrating how a reflux assembly can be rotated and quickly re-arranged for distillation

SM-685

CLAMP, semi-micro, designed by J. C. Spiring, Patent No. 1070015. A simple but versatile clamp for supporting assemblies made from small scale preparative set DT-760 and similar apparatus. Comprises a slotted bar 17 cm long with 8 mm dia. rod for mounting in bossheads SM-610, SM-636 and SM-638. The assemblies are held in two spring clips; both clips can be rotated and one can slide to vary the distance between them from 8·5 to 15 cm. The clamp can be held vertical or horizontal or at any oblique angle. Supports a variety of glass assemblies easily and securely with consequent saving of time and reduction in breakages ... ... Ten **£13·00** Each **£1·45** *bx*



SM-695
SM-705

PLATES

SM-695

SUPPORT PLATE, diameter 7·5 cm, with 11·5 cm long rod, 8 mm diameter, to fit bossheads SM-610, SM-636 and SM-638 ... ... Ten **£6·80** Each **£0·76** *bx*

SM-705

SUPPORT PLATE, diameter 10 cm, with 12·5 cm long rod, 11 mm diameter, for use with bossheads SM-480, SM-610 and SM-630 .... Ten **£7·20** Each **£0·80** *cx*

RINGS

SM-710

SUPPORT RING, open, vinyl covered, internal diameter 25 mm, with 11·5 cm long rod, 8 mm diameter, to fit bossheads SM-610, SM-636 and SM-638.
Ten **£4·70** Each **£0·52** *bx*

***SM-718**

SUPPORT RING, polypropylene, suitable for conical funnels from 25 to 120 mm diameter. Has integral bosshead with adapters for mounting on rods from 10 to 13 mm diameter. Centre to centre distance approximately 90 mm. Each **£1·50** *mx*

SM-720

RINGS, retort stand, of dull plated mild steel 8 mm rod with welded joint and plain stem. The sizes are chosen from the R10 series of preferred numbers in BS 2045 so that each step represents an increase in diameter of approx. 25%. To fit bossheads SM-610, SM-636 and SM-638.

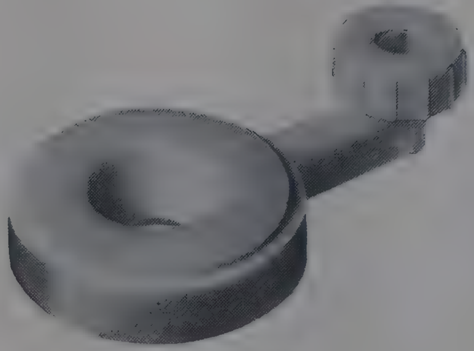
Internal dia.	5	6·3	8	10	12·5	16 cm	
Stem length	14	13	12·5	11·5	10	9 cm	
Ten	**£3·00**	**3·30**	**3·50**	**3·70**	**3·90**	**4·30**	cx
Each	**£0·36**	**0·39**	**0·41**	**0·43**	**0·44**	**0·48**	

ASBESTOS YARN, for wrapping retort stand rings. see AR-540

CORK RINGS for supporting flasks, etc. see CV-070

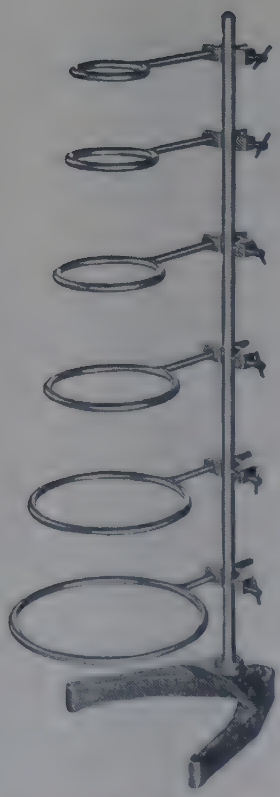
For details and prices see entries in List No. sequence.

SM-710



SM-718

SM-720



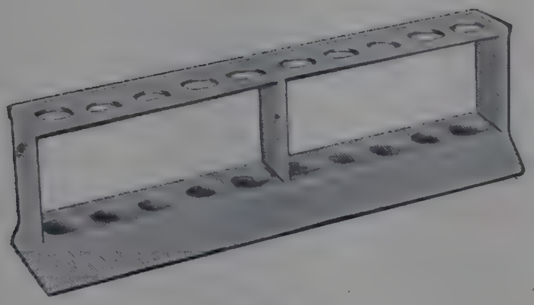
SM-720 series with SM-636 on stand

TEST TUBE STANDS

SM-824

TEST TUBE STANDS, hardwood, with or without draining pegs.

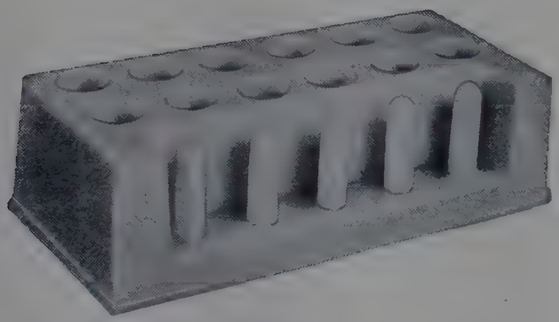
List No.	No. of holes 20 mm dia.	No. of holes 32 mm dia.	No. of pegs	Ten	Each	
				£	£	
SM-822	10	2	—	**6·40**	**0·72**	*cx*
SM-824	5	1	6	**6·20**	**0·68**	*cx*
SM-826	10	2	12	**9·40**	**1·04**	*cx*
SM-828	—	6	—	**5·20**	**0·58**	*cx*



SM-865

***SM-865**

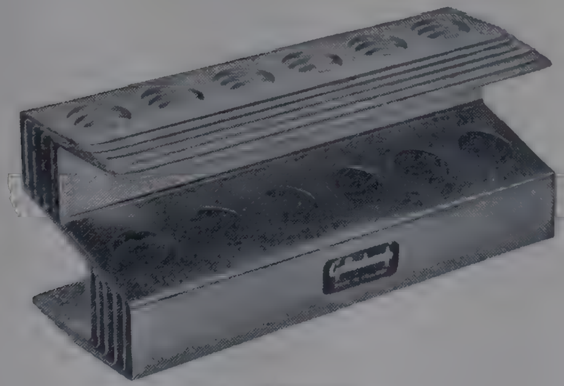
TEST TUBE STAND, rigid polythene, with ten 19 mm diameter holes ... Ten **£7·10** Each **£0·82** *mx*



SM-872

***SM-872**

TEST TUBE STAND, rigid polythene, with twelve 20 mm diameter holes in two rows, and five 11 mm diameter draining pegs ... ... Each **£1·25** *mx*



6 × SM-880
nested for storage

SM-880

TEST TUBE STAND, stainless steel. Can be nested for economical storage. Resilient construction from one piece of stainless steel. With 6 holes 20 mm diameter in one row ... ... Ten **£11·20** Each **£1·25** *mx*

SM-885

TEST TUBE STAND, stainless steel. Nesting pattern as SM-880 but with 12 holes 20 mm diameter in two rows ... ... Ten **£14·80** Each **£1·65** *mx*

WF-391

Stands for certain sizes of tubes will also be found in List No. sequence as follows:

CX-480	Rack for 48 culture tubes, 16 mm dia.
ME-482	Rack for 30 Kahn or culture tubes, 20 mm dia.
WF-385 to WF-393	Range of water bath racks to hold 12 to 25 mm dia. tubes

TRIPOD STANDS

SM-910

TRIPOD STANDS, cast iron, with triangular top and splayed steel legs. Overall height 20 cm.

Length of side	12·5	15 cm	
Ten	**£4·30**	**5·10**	*cx*
Each	**£0·48**	**0·57**	

SM-915

TRIPOD STANDS, cast iron, with circular top and splayed steel legs.

Overall height	20	25 cm	
Top diameter	12·5	20 cm	
Ten	**£5·70**	**9·00**	*cx*
Each	**£0·64**	**1·00**	

For suitable Gauzes see GK-100 and GK-105 in List No. sequence.

For suitable **Wire Triangles** see TV-540 to TV-570 in List No. sequence.

SM 910

SM-915

Bottle stands	see	FY-932 and HJ-450
Burette stands	see	BW-880 and BW-881
Gas cylinder stands	see	GD-620 and GD-625
Oven and incubator stands	see	OV-480 to OV-484
Nessler tube stands	see	CT-868 and CT-869
Text book stand	see	FX-548
Titration stands	see	EJ-920 and EJ-925
Westergren tube stand	see	MC-675

For details and prices see entries in List No. sequence.

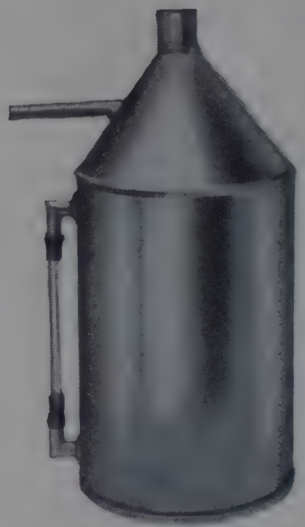
STEAM GENERATOR

SP-430

STEAM GENERATOR, copper, with all joints brazed. With outlet tube and glass gauge tube.

Dimensions, approx.	
Overall	30 cm high × 15 cm dia.
Neck	25 mm int. dia.
Outlet tube	8 mm ext. dia.
Capacity	4 litres

Each **£12·00** *cx*



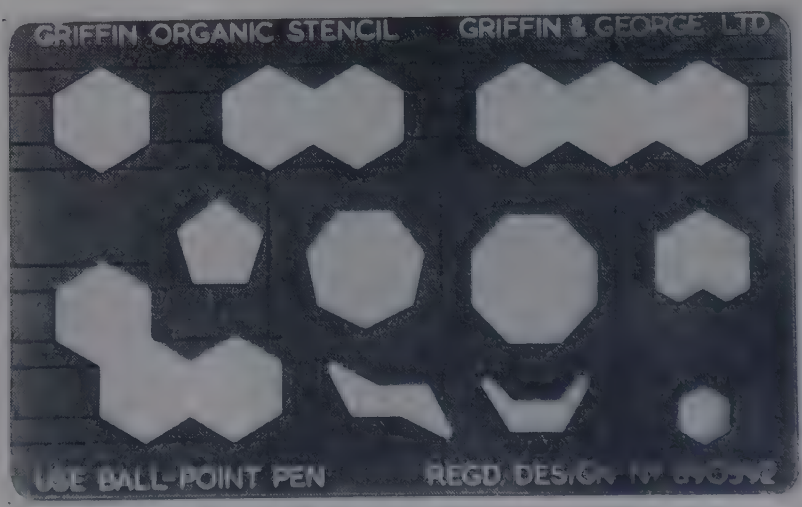
SP-430

STENCIL

SP-950

STENCIL, *Griffin,* **organic and structural chemical.** A transparent plastics sheet, approximately 130 × 75 mm; with 11 figures, cut to suit standard typewriter spacing and representing: the benzene nucleus (in both single and double typewriter spacing); the condensed ring systems naphthalene, anthracene and phenanthrene; five-, seven- and eight-membered ring systems; a heterocyclic six-membered ring system (a hexagon with two half-length sides); and the chair and boat forms of cyclohexane. Guide lines are ruled on the underside of the stencil.

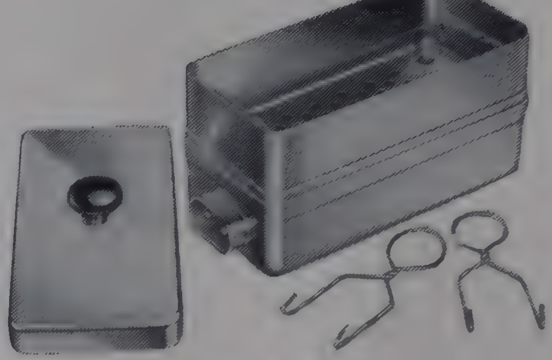
Ten **£7·10** Each **£0·83** *mx*



SP-950

STEAM AND HOT AIR STERILISERS

SR-632



SR-600

SR-600

STERILISER, STEAM, electrically heated., Includes automatic safety cut-out to operate if the bath boils dry. With a removable perforated tray, tray lifters and cover. Boiler dimensions 19×8·5×5 cm; overall dimensions 20×9×10 cm. Heater rating 300W. For 230/250V a.c. supplies ... ... Each **£15·20** *fx*

SR-654

SR-632

STERILISER, STEAM, electrically heated. Fitted with 3-heat switch control and automatic safety cut-out to prevent damage in the event of boiling dry. Seamless chromium plated boiler with tap, hinged lid and robust, lever operated tray lifting mechanism. All handles are heat insulated. The lid closes into a drip channel to prevent water dripping down outside. Boiler dimensions 35×16×12·5 cm; overall dimensions 46×17×22 cm. Heater rating 1200W. For 230/250V a.c. supplies. Each **£66·50** *fx*

SR-654

STERILISER, HOT AIR, electrically heated with thermostatic control in the range 100° to 200°C. The thermostat control knob and a timer range 0 to 120 min are mounted on the control panel. Two pilot lights indicate mains connection and thermostat operation. A hole for insertion of a mercury in glass thermometer is provided. Internal dimensions 30×17×20 cm; overall dimensions 42×28×37 cm; weight 12 kg. Heater rating 900W. For 220/240V a.c. supplies. **With three removable trays but without thermometer.** Each **£72·00** *mxN*

SR-720

SR-720

STERILISER, STEAM, electrically heated, Koch pattern. The internal surfaces and two removable perforated shelves are of tinned copper while the external surfaces and cover are constructed from copper and hardboard finished in grey duotone stoved enamel. Heated by double loop tubular immersion heater with connector which is ejected if the chamber boils dry. With filling trough and mounted on four feet. The cover is fitted with lifting handles and a 25 mm dia. thermometer tubulure. Overall dimensions 71×33×42 cm. Internal dimensions 30×30×40 cm deep. Heater rating 1500W. For 220/240V a.c. supplies ... ... Each **£85·00** *mx*

When ordering STERILISERS please state voltage and frequency of supply.

Gallenkamp OVENS

FOR HOT AIR STERILISING

The following *Gallenkamp* laboratory ovens are frequently used as hot air sterilisers. Full specifications and details may be found under OVENS.

OV-010	'Hotbox' Oven/Sterilisers.
OV-060	Economy Oven.
OV-160 **OV-330**	BS Ovens.
OV-420	Large capacity Oven/Steriliser.

See also *Gallenkamp* electric, gas and steam **AUTOCLAVES.**

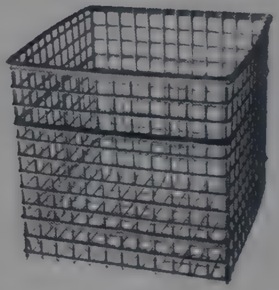
STERILISING ACCESSORIES

FOR STEAM STERILISING AT TEMPERATURES UP TO 120°C

SR-760

STERILISING BASKETS, steel wire nylon coated, for test tubes.

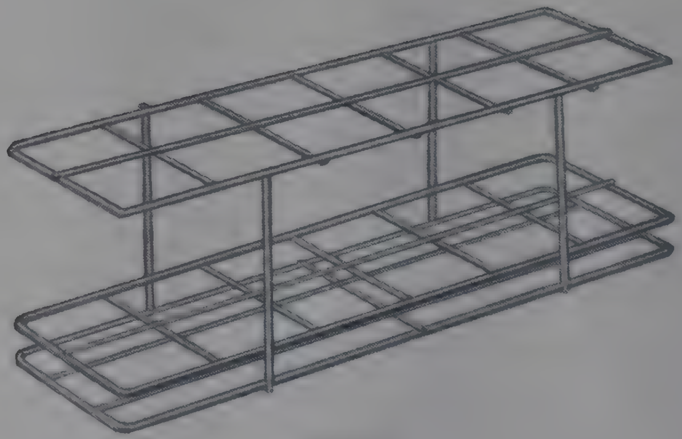
Dimensions	10×10×10	15×15×15	20×20×20 cm	
Each	**£1·30**	**1·50**	**1·90**	*cx*



SR-760

SR-772

STERILISING RACK, steel wire nylon coated, to hold twelve McCartney bottles CX-210 or CX-215 or universal containers CX-220. Overall dimensions 22×7×8 cm ... ... Ten **£9·80** Each **£1·08** *cx*



SR-772

FOR STEAM AND HOT AIR STERILISING AT HIGHER TEMPERATURES

SR-800

STERILISING BOXES, stainless steel, for pipettes, with close fitting lid.

Length Diameter	38 6·5	45 cm 6·5 cm	
Each	**£3·10**	**3·60**	*cx*

SR-820

STERILISING BOX, stainless steel, with lifting rack, for 10 cm diameter Petri dishes. Length 26 cm, diameter 12 cm ... ... Each **£6·00** *cx*

SR-800

SR-820

Dishes—see DM-240 et seq. in List No. sequence.
'Sterile' labels—see LB-150 in List No. sequence.
Trays—see TU-515 et seq. in List No. sequence.

x

Gallenkamp HANDILAB STIRRER

THE VERSATILE STIRRER WITH PUSH-FIT ACCESSORIES

ACCESSORIES INCLUDE:

- Stirrer paddles in polythene or stainless steel
- Orbital mixer for speedy mixing of test tube contents
- Magnetic head for remote stirring in closed vessels
- Chuck for 6·35 mm (¼ in) diameter fittings
- Pulley for belt driving stirrers, etc.

SS-425 with rotor, beaker and stand

HOLLOW SHAFT MOTOR FACILITATES:

- Rapid push-in fitting of accessories
- Accurate adjustment of stirrer height or immersion depth
- Quick raising of stirrer for removal of beaker or container
- Fitting accessories from either end of the shaft
- Clockwise or counterclockwise rotation

SS-425

STIRRER, Handilab, *Gallenkamp*, as specification comprising fan cooled induction motor with hollow shaft. Maximum speed approximately 1200 rev/min.

Motor dimensions	150×75 mm dia.
Mounting rod dimensions	200×13 mm dia.
Weight, net	2·2 kg

With 3-core mains cable.

Without accessories.

For 220/240V 50 Hz single phase supplies.	Each	**£11·00** *bx*
For 200/210V 50 Hz single phase supplies.	Each	**£16 00** *bx*
For 110/120V 60 Hz single phase supplies.	Each	**£16·00** *bx*

When ordering please state voltage and frequency of supply.

SS-426

STIRRER KIT, Handilab, *Gallenkamp*, comprising hollow shaft stirrer SS-425, stainless steel rotor SS-430, polythene rotor SS-440, magnetic stirring rotor SS-444, set of magnetised followers SS-730, pulley SS-460, chuck SS-455 and glass rotor SS-550.

For 220/240V 50 Hz single phase supplies.	Each	**£21·00** *bx*
For 200/210V 50 Hz single phase supplies.	Each	**£25·00** *bx*
For 110/120V 60 Hz single phase supplies.	Each	**£25·00** *bx*

When ordering please state voltage and frequency of supply.

ACCESSORIES

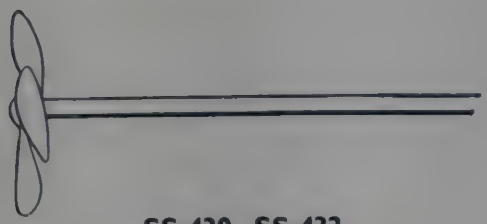
SS-427 **Rheostat,** rotary, for bench or wall mounting, enabling speed of stirrer SS-425 to be varied. With 3-core cable, plug and socket connector.

For 200/250V single phase supplies ...	Each	**£11·00** *bx*
For 110/120V single phase supplies ...	Each	**£11·50** *bx*

When ordering please state voltage of motor for which rheostat is required.

LX-110 **Lubricant,** for motor bearings. For details and price see entry in List No. sequence.

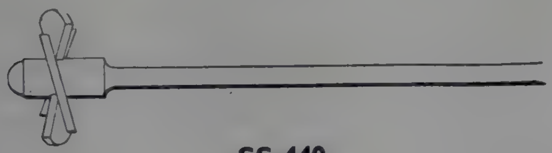
Gallenkamp HANDILAB STIRRER ACCESSORIES



SS-430, SS-432

SS-430
ROTOR, stainless steel, with 38 cm shaft and 4-bladed 4·5 cm impeller ... ... Ten **£7·00** Each **£0·78** *bx*

SS-432
ROTOR, stainless steel, with 38 cm shaft and 4-bladed 5·7 cm impeller ... ... Ten **£7·20** Each **£0·80** *bx*

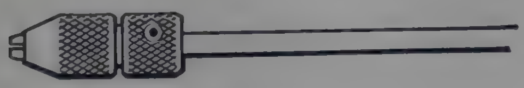


SS-440

SS-440
ROTOR, polythene, with 38 cm steel reinforced shaft and 4-bladed 4·5 cm impeller.
Ten **£7·60** Each **£0·84** *bx*

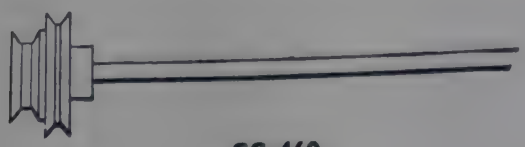
SS-444
ROTOR, magnetic, with 18 cm stainless steel shaft and magnet enclosed in 6 cm diameter resin mounting.
Ten **£28·50** Each **£3·20** *bx*

SS-450
ORBITAL MIXER, for producing a vigorous vortex mixing action in the contents of test tubes and small containers. The mixer comprises a rubber cup mounted eccentrically on a ball race on a stainless steel rod which fits the hollow shaft of the stirrer. In use, the test tube is held in the hand and the bottom of the tube is pressed into contact with the rubber cup. The two then orbit smoothly in contact until the tube is withdrawn. There is no need to stop the motor for this purpose.
Each **£2·10** *bx*



SS-455

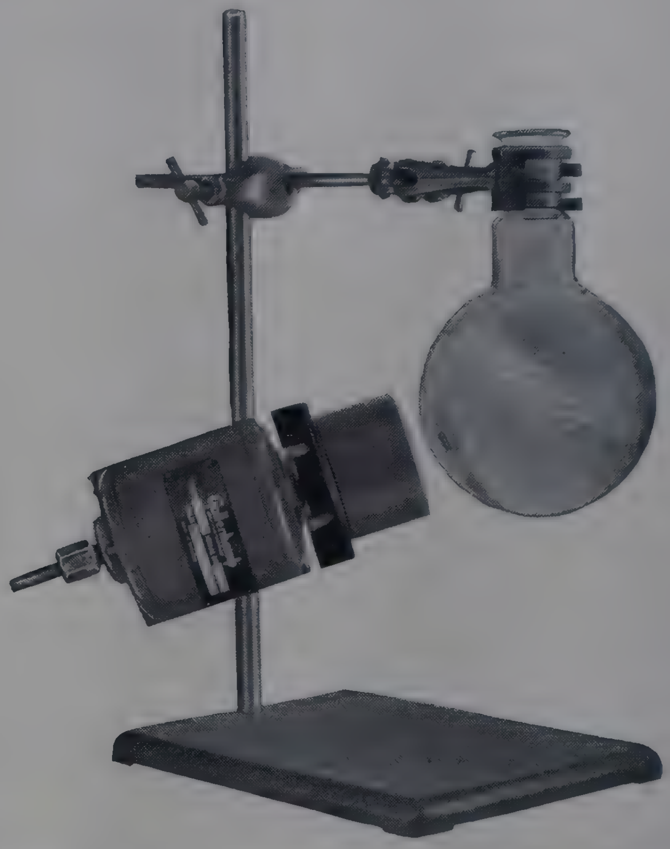
SS-455
CHUCK, 6·35 mm ($\frac{1}{4}$ in) with 20 cm stainless steel shaft, to convert hollow shaft motor for conventional fixed length rotors ... ... Ten **£11·00** Each **£1·25** *bx*
For rotors to fit chuck, see SS-544 to SS-556 in List No. sequence.



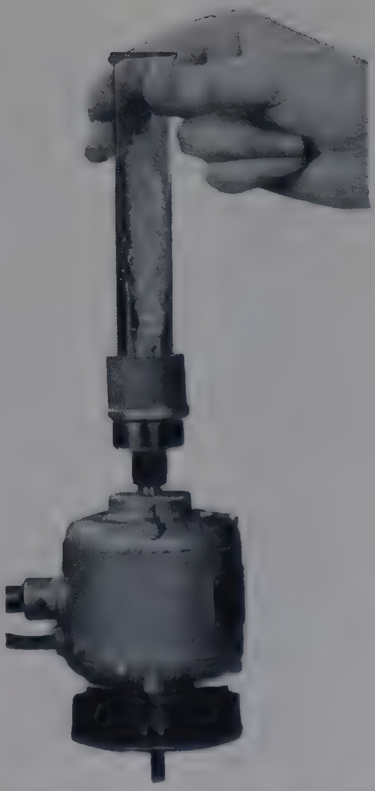
SS-460

SS-460
PULLEY, 2-step, 2·5 and 3·75 cm diameter with 20 cm stainless steel shaft ... Ten **£15·50** Each **£1·70** *bx*

Pulley driven ROTOR, for 24/29 standard socket, see SS-570 in List No. sequence.



SS-425 with magnetic rotor SS-444 and follower, stirring the contents of a flask



SS-425 with orbital mixer SS-450 stirring contents of a test tube

Gallenkamp VARIABLE SPEED STIRRERS

TWO MODELS WITH SPEED CONTROLS AND CHUCKS TO ACCEPT 6·35 mm (¼ in) DIA. ACCESSORIES

SS-510
with accessories on stand

NOTE: These stirrers are not suitable for use where very accurate and drift free speed control are essential.

SS-530 with SS-544
on stand

GEARED DRIVE MODEL

- 80 to 600 and 400 to 4000 rev/min on maximum load
- Maximum torque 2·5 kgf cm
- 13 mm stainless steel support tube encloses the supply cable

SS-510

STIRRER, *Gallenkamp,* **variable speed, geared.** With solid state speed controller mounted in separate control box connected to the motor by a 6 ft length of cable. A chuck which accepts 6·35 mm diameter stirrers or other accessories may be fitted either to the shaft at one end of the motor, for speeds up to 4000 rev/min or to the gearbox output shaft for speeds up to 600 rev/min on maximum load.

Motor dimensions	180 × 110 mm dia.
Control unit dimensions	110 × 90 × 50 mm
Weight, net	3·5 kg

For a.c. single phase supplies only. **Without accessories.**

For 220/240V	Each	**£34·00**	*gx*
For 110/120V	Each	**£37·00**	*gxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

SS-512	**Brushes, for motor**	Pair	£0·20	*gx*
SS-538	**Spare chuck.** For price see entry in List No. sequence.			

DIRECT DRIVE MODEL

- Up to 2500 rev/min
- For light duty stirring of low viscosity liquids
- Suitable for a.c. or d.c. supplies
- 13 mm stainless steel support tube encloses the supply cable

SS-530

STIRRER, *Gallenkamp,* **variable speed,** with built-in rotary rheostat controlling the speed in ten fixed steps up to 2500 rev/min. Fitted with a chuck to accept stirring rotors having 6·35 mm diameter shafts.

Motor dimensions	180 × 100 mm dia.
Weight, net	1·4 kg

For a.c. or d.c. supplies. **Without accessories.**

For 220/240V	Each	**£26·50**	*bx*
For 200/210V	Each	**£28·50**	*bxN*
For 110/120V	Each	**£28·50**	*bxN*

SS-535

STIRRER KIT, *Gallenkamp,* **variable speed,** comprising stirrer SS-530, stainless steel rotor SS-544, glass rotor SS-550, polythene rotor SS-552 and pulley SS-556.

For 220/240V	Each	**£30·00**	*bx*
For 200/210V	Each	**£32·00**	*bxN*
For 110/120V	Each	**£32·00**	*bxN*

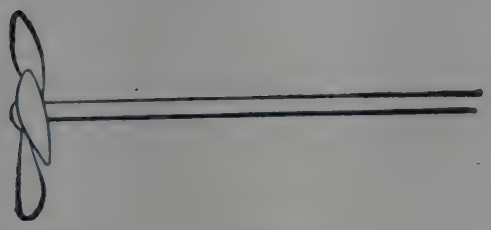
When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

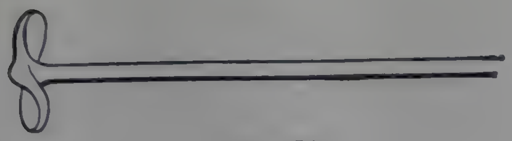
SS-536	**Brushes, for motor**	Pair	£0·35	*bx*
SS-538	**Spare chuck**	Each	£0·80	*bx*

Gallenkamp STIRRERS

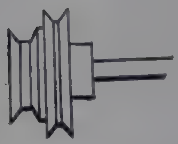
ACCESSORIES with shafts to fit 6·35 mm ($\frac{1}{4}$ in) chucks.



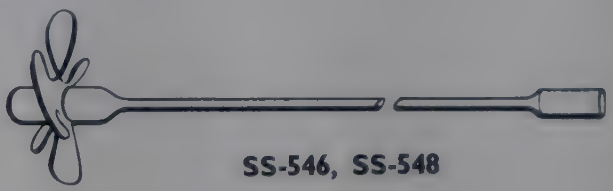
SS-544



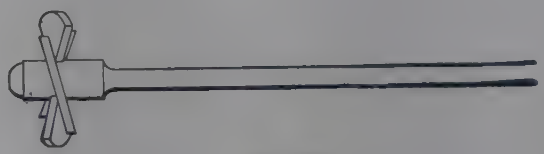
SS-550



SS-556



SS-546, SS-548



SS-552

SS-544
ROTOR, stainless steel, with 20 cm shaft and 4-bladed 4·5 cm impeller ... ...Ten **£5·30** Each **£0·59** *bx*

SS-546
ROTOR, stainless steel, with 25 cm flexible shaft and 4-bladed 4·5 cm self-aligning impeller.
Ten **£9·40** Each **£1·04** *bx*

SS-548
ROTOR, stainless steel, with 46 cm flexible shaft and 4-bladed 5·7 cm self-aligning impeller.
Ten **£9·60** Each **£1·06** *bx*

SS-550
ROTOR, glass, with 20 cm shaft and 2-bladed 3 cm impeller ... ...Ten **£5·10** Each **£0·57** *ax*

SS-552
ROTOR, polythene, with 20 cm steel reinforced shaft and 4-bladed 4·5 cm impeller.
Ten **£7·00** Each **£0·78** *bx*

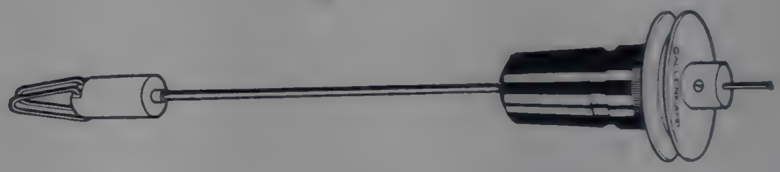
SS-554
FLEXIBLE DRIVE, enclosed in armoured covering. 46 cm long and bored at driving end to accept 6·35 mm stirrer shaft ... ...Ten **£27·00** Each **£3·00** *bx*

SS-556
PULLEY, 2-step, 2·5 and 3·75 cm dia. with 7·5 cm stainless steel shaft ...Ten **£13·00** Each **£1·45** *bx*

ACCESSORY
MX-760 **Driving belts.** For details and prices see entry in List No. sequence.

PULLEY DRIVEN ROTOR

SS-570
ROTOR, *Gallenkamp,* **pulley driven,** for vacuum applications. Comprising 24/29 plastics cone, pulley running on ball bearings, stuffing box and flexible stainless steel shaft 33 cm long fitted with link rotor. Working depth of shaft is adjustable and links extend to 6·5 cm diameter ... ... Each **£9·40** *bx*



SS-570

Gallenkamp ECONOMY MAGNETIC STIRRER

Designed for use in schools, colleges and laboratories where speed control is not required

- **Spark-free brushless motor**
- **Fixed speed of approximately 500 rev/min**
- **13 cm dia. and 9·5 cm high**

SS-590
MAGNETIC STIRRER, *Gallenkamp,* **Economy,** comprises brushless motor and magnet, mounted in an anodised aluminium case. Stirrer speed approximately 500 rev/min. Supplied with 25 mm magnetic follower encased in polypropylene and mains connecting cable. Overall dimensions 13 cm dia. × 9·5 cm high. Weight 1 kg.

For 220/240V 50 Hz single phase supplies. Each **£9·00** *bx*

For 110/120V 60 Hz single phase supplies. Each **£9·50** *bx*

SS-590 with beaker

Gallenkamp MAGNETIC STIRRERS AND STIRRER/HOTPLATES

WITH SOLID STATE SPEED CONTROLLER

Compact variable speed magnetic stirrers suitable for use with aqueous solutions and liquids of similar viscosity. Models available with and without controlled temperature hotplate.

Gallenkamp
MAGNETIC STIRRER

SS-660 with rod

Gallenkamp
MAGNETIC STIRRER HOTPLATE

SS-670 with rod

Applications include:

- Titrations
- Precipitations
- Preparation of solutions
- Electrochemical testing
- Stirring liquids in closed containers
- Stirring liquids in evacuated systems

Stirrer design features:

- ■ Solid state continuously variable speed control
- ■ Speed control up to 1300 rev/min depending on load
- ■ Drive magnet mounted on silent brushless motor
- ■ Negligible self heating of case over long periods of stirring
- ■ Control knob has 'click' OFF position
- ■ Ptfe coated followers included—others available

Hotplate design features:

- ■ Choice of energy regulator or thermostat control
- ■ Controls have indexed OFF position
- ■ Aluminium hotplates 12·5 cm diameter
- ■ Tubular sheathed heater cast into hotplate
- ■ Negligible bench heating at maximum temperatures

All models are housed in cases with white polyurethane sprayed aluminium tops and stoved hammer-grey steel bases. The design incorporates inconspicuous air vents instead of traditional louvres and enables the apparatus to be dismantled easily for adjustment and servicing. A 13 mm diameter threaded support rod may be mounted within the case top; there is no projecting boss on the outside. Rubber feet are fitted. Hotplate models have a drip-guard to minimise entry of spillage into the case.

NOTES:

1. Magnetic stirrer/hotplates incorporate powerful circular alloy magnets designed to withstand high temperature working conditions.
2. Ptfe, as used on the followers supplied, has a maximum working temperature of 300°C.
3. The polyurethane finish on the aluminium tops has a high physical and chemical durability and is ideally suited to this particular laboratory application.

OVERALL DIMENSIONS AND WEIGHTS

without support rods

List No.	Dimensions, cm H W D	Weight, kg
SS-660	8 × 21 × 19	3
SS-670	13 × 21 × 19	4
SS-675		

Gallenkamp MAGNETIC STIRRERS AND STIRRER/HOT PLATES

SS-660

MAGNETIC STIRRER, *Gallenkamp,* **1300 rev/min maximum,** as specification, with mains indicator lamp and 1·5 m mains lead. Includes one each 20 mm and 40 mm ptfe coated followers **without support rod.**

For 200/240V 50 Hz single phase supplies.	Each	**£19·00** *bx*
For 110/120V 60 Hz single phase supplies.	Each	**£19·50** *bx*

When ordering please state voltage and frequency of supply.
Accessories—see below.

SS-670

MAGNETIC STIRRER/HOTPLATE, *Gallenkamp,* **1300 rev/min and 450°C maxima,** as specification, with **energy regulator controlled** 400W hotplate, mains and load indicator lamps and 1·5 m mains lead. Includes one each 20 mm and 40 mm ptfe coated followers. **Without support rod.**

For 200/240V 50 Hz single phase supplies.	Each	**£29·00** *bx*
For 110/120V 60 Hz single phase supplies.	Each	**£29·50** *bx*

When ordering please state voltage and frequency of supply.
Replacement part and Accessories—see below.

Gallenkamp
MAGNETIC STIRRER
HOTPLATE
100
140
180
220
260
300
off
°C
2
3
4
5
6
7
8
9
10
speed

SS-675

SS-675

MAGNETIC STIRRER/HOTPLATE, *Gallenkamp,* **1300 rev/min and 300°C maxima,** as specification, with **thermostat controlled** 400W hotplate, mains and load indicator lamps and 1·5 m mains lead. Includes one each 20 mm and 40 mm ptfe coated followers. **Without support rod.**

For 200/240V 50 Hz single phase supplies.	Each	**£30·00** *bx*
For 110/120V 60 Hz single phase supplies.	Each	**£30·50** *bx*

When ordering please state voltage and frequency of supply.

For 3-place magnetic stirrer hotplate see overleaf.

REPLACEMENT PART for SS-670 and SS-675

SS-678 Hotplate, with cast-in 400W tubular sheathed heater. Each **£5·50** *bx*

ACCESSORIES

SM-450 et seq.	**Support rods**	For details and prices see entries in List No. sequence.
SS-730 et seq.	**Magnetic followers**	
SS-742 et seq.	**Magnetic follower retrievers**	

Gallenkamp HANDILAB STIRRER with MAGNETIC ROTOR

see SS-425 and SS-444 in List No. sequence.

Gallenkamp 3-TEST MAGNETIC STIRRER/HOTPLATE

WITH SOLID STATE SPEED CONTROLLER

Suitable for use with aqueous solutions and liquids of similar viscosity.

- **Individual stirrer and heater controls with OFF positions for each hotplate**
- **Speed range 0 to 1300 rev/min depending on load**
- **Tubular sheathed heaters cast into hotplates**
- **All controls housed in enamelled metal case**
- **Bosses accept 13 mm dia. support rods**

SS-690

Applications include titrations, precipitations, preparation of solutions, electrochemical testing, stirring liquids in closed containers, stirring liquid in evacuated systems, etc.

DIMENSIONS without support rod

	H W D
Overall	14×52×27 cm
Weight, net	9 kg

SS-690
MAGNETIC STIRRER/HOTPLATE, *Gallenkamp,* **3-test,** as specification, **1300 rev/min and 450°C maxima.** With energy regulator controlled aluminium hotplates, each 12·5 cm diameter, mains and load indicator lamps and 1·5 m mains lead. Includes three each 20 mm and 40 mm ptfe coated followers. **Without support rods.**

For 200/240V 50 Hz single phase supplies.	Each	**£84·00**	*bx*
For 110/120V 60 Hz single phase supplies.	Each	**£85·50**	*bx*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

SS-678	**Hotplate with cast-in 400W tubular sheathed heater** ...	For price see entry in List No. sequence.

ACCESSORIES

SM-450 et seq.	**Support rods**	For details and prices see entries in List No. sequence.
SS-730 et seq.	**Magnetic followers**	
SS-742 et seq.	**Magnetic follower retriever**	

NOTE: Ptfe as used on the followers supplied has a maximum working temperature of 300°C.

MAGNETIC STIRRER FOLLOWERS

SS-730
MAGNETISED FOLLOWER SET, comprising one each all sizes SS-732 (glass) and SS-736 (polypropylene).
Ten sets **£21·00** Set **£2·35** *cx*

SS-732
MAGNETISED FOLLOWERS, encased in glass.

Length	6	13	19	25	38	50 mm	
Ten	**£1·30**	**1·40**	**1·50**	**1·60**	**1·80**	**1·90**	*cx*
Each	**£0·20**	**0·21**	**0·22**	**0·23**	**0·25**	**0·26**	

SS-734
MAGNETISED FOLLOWERS, encased in ptfe.

Length	12	20	40	60 mm	
Ten	**£4·10**	**4·80**	**5·90**	**9·80**	*cx*
Each	**£0·47**	**0·53**	**0·66**	**1·08**	

SS-736
MAGNETISED FOLLOWERS, encased in polypropylene.

Length	12	25	45	60 mm	
Ten	**£1·80**	**2·50**	**3·20**	**4·00**	*cx*
Each	**£0·25**	**0·32**	**0·38**	**0·45**	

SS-738
MAGNETISED FOLLOWERS, as SS-736 but with centre rim.

Length	40	60 mm	
Ten	**£2·90**	**4·00**	*cx*
Each	**£0·35**	**0·45**	

SS-742
RETRIEVER, comprising magnet encased in glass tube 8 mm dia., 30 cm long ... Ten **£4·50** Each **£0·50** *bx*

SS-744
RETRIEVER, as SS-742 but encased in ptfe. 10 mm dia., 35 cm long ... ... Each **£2·25** *cx*

HINTS FOR THE USE OF MAGNETIC STIRRERS AND FOLLOWERS

1. Different lengths of follower give widely differing stirring characteristics. Try out several sizes.
2. Ensure that the follower coating does not react with the liquid to be stirred.
3. If the stirrer motor fails to rotate, turn the speed control up, raise or rotate the beaker.
4. If the follower spins out of control, reduce stirring speed.
5. Where very critical stirring is required spacers of paper, glass etc. placed under the beaker often yield useful results.

COMPRESSED AIR STIRRER

SS-760

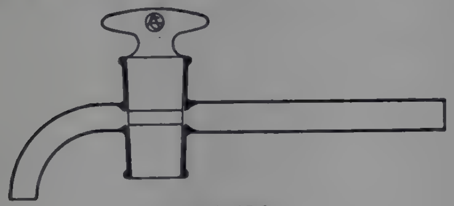
STIRRER, compressed air, *Turbinia*, for operating at air pressures above 1 kgf/cm² giving a speed up to approx. 10,000 rev/min. This stirrer has a consumption of 30 l/min of air at 2 kgf/cm². The chuck takes stirring rotors up to 6·35 mm diameter. With two glass rotors and bosshead for mounting on retort stand ... ... Each **£27·60** *fx*

SEMI-MICRO STIRRER, which can be driven by **COMPRESSED AIR, VACUUM** or **WATER** see Q-MU8/0 in the *Quickfit* Section.

For high speed MIXER-EMULSIFIERS see MU-961 and MU-965 in List No. sequence.

SS-760

ASPIRATOR STOPCOCKS


ST-420

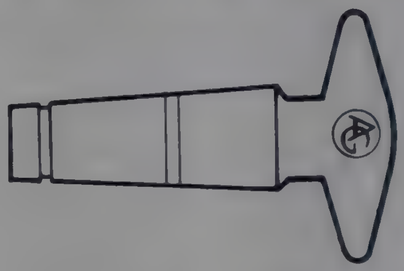
ST-420

STOPCOCKS, (AG), aspirator, borosilicate glass, single straight bore.

Bore of key	3	5	7	10 mm	
Tube dia., approx.	8	9	11	15 mm	
Ten	**£5·80**	**7·60**	**13·40**	**18·50**	*ax*
Each	**£0·64**	**0·84**	**1·50**	**2·05**	

Aspirator stopcocks—see AU-348, AU-367 and AU-447 in List No. sequence.

STOPCOCK KEYS


ST-440 ST-442

ST-440

STOPCOCK KEYS, (AG), ₷ interchangeable, soda-lime glass ... ... Ten **£3·30** Each **£0·39** *ax*

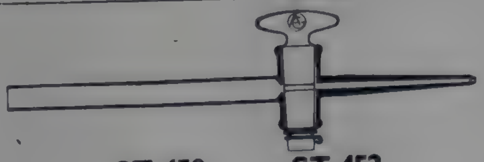
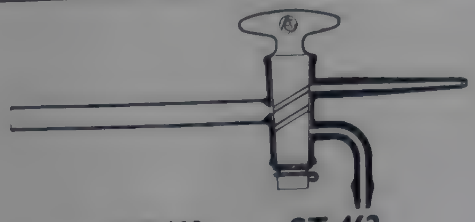
ST-442

STOPCOCK KEYS, (AG), ₷ interchangeable, borosilicate glass ... ... Ten **£3·30** Each **£0·39** *ax*

BURETTE STOPCOCKS 1—2 mm BORE

with retaining springs and 9 mm o.d. side tube

Regd

PATTERN				Soda-lime glass	Borosilicate glass	
 ST-450 ST-451 ST-452 ST-453	Straight bore with capillary jet, for sealing to burettes	Individually fitted keys	Ten Each	**ST-450** **£4·50** **£0·50**	**ST-452** **£5·50** **£0·62**	*ax*
		Interchangeable ₷ keys	Ten Each	**ST-451** **£7·20** **£0·80**	**ST-453** **£7·20** **£0·80**	*ax*
 ST-460 ST-462	Double oblique bore with capillary jet and bent filling tube, for sealing to burettes	Individually fitted keys	Ten Each	**ST-460** **£8·20** **£0·92**	**ST-462** **£9·20** **£1·02**	*ax*

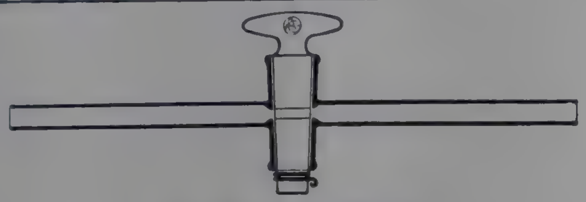
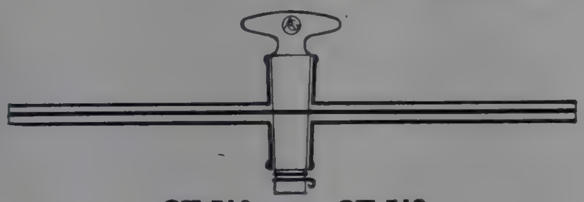
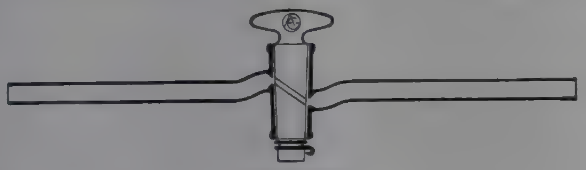
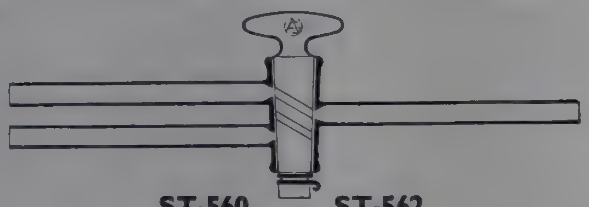
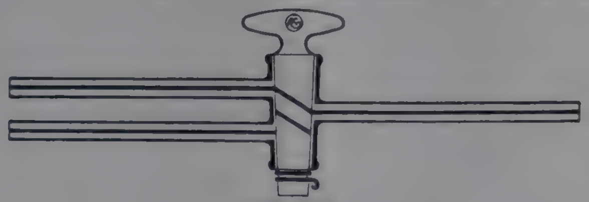
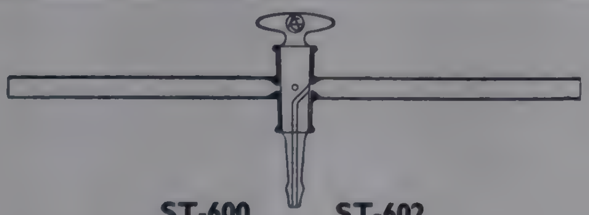
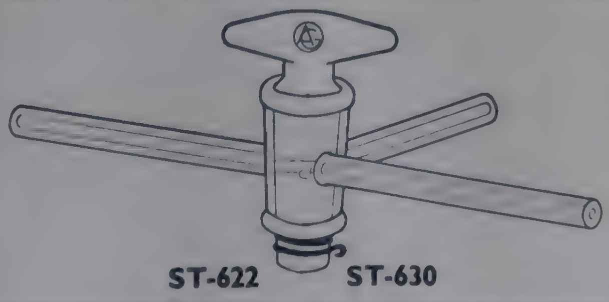
For spare ₷ keys see ST-440 and ST-442 entry above.

For spare retaining springs see ST-650 in List No. sequence.

STOPCOCKS 1—2 mm BORE

with retaining springs and 7 mm o.d. side tubes

Regd.

PATTERN				Soda-lime glass	Borosilicate glass	
 ST-500 ST-504 ST-501 ST-505	Single straight bore with wide bore side tubes	Individually fitted keys	Ten Each	ST-500 £4·30 £0·48	ST-504 £5·50 £0·62	ax
		Interchangeable $ keys	Ten Each	ST-501 £6·60 £0·74	ST-505 £6·60 £0·74	ax
 ST-510 ST-512 ST-511 ST-514	Single straight bore with capillary side tubes	Individually fitted keys	Ten Each	ST-510 £4·90 £0·54	ST-512 £5·80 £0·64	ax
		Interchangeable $ keys	Ten Each	ST-511 £7·20 £0·80	ST-514 £7·20 £0·80	ax
 ST-530	Single oblique bore with wide bore side tubes	Individually fitted keys	Ten Each	— —	ST-530 £7·60 £0·86	ax
 ST-560 ST-562	Double oblique bore with wide bore side tubes	Individually fitted keys	Ten Each	ST-560 £9·40 £1·04	ST-562 £11·40 £1·25	ax
 ST-570	Double oblique bore with capillary side tubes	Individually fitted keys	Ten Each	— —	ST-570 £11·80 £1·30	ax
 ST-600 ST-602	Straight bore with second bore to connect either side tube to tail. **Without retaining spring**	Individually fitted keys	Ten Each	ST-600 £9·40 £1·04	ST-602 £10·60 £1·18	ax
 ST-622 ST-630	T-bore with wide bore side tubes and third side tube perpendicular to the other two	Individually fitted keys	Ten Each	ST-620 £7·20 £0·80	— —	ax
	T-bore as ST-620 but with capillary side tubes	Individually fitted keys	Ten Each	ST-622 £7·60 £0·84	ST-630 £7·60 £0·84	ax

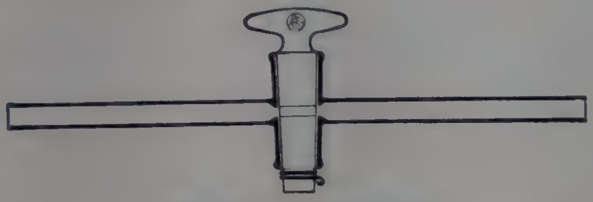
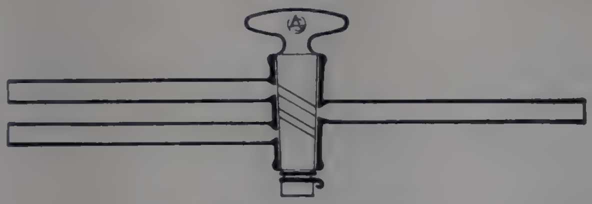
For spare $ keys see ST-440 and ST-442 in List No. sequence.

For spare retaining springs see ST-650 in List No. sequence.

STOPCOCKS 3—4 mm BORE

with retaining springs, 9 mm o.d. side tubes and individually fitted keys

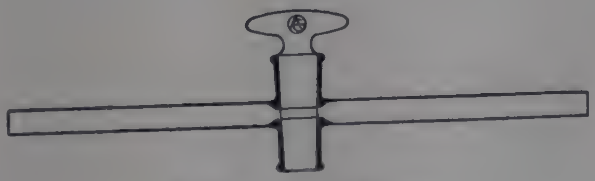
Regd

PATTERN			Soda-lime glass	Borosilicate glass	
 ST-632 ST-633	Single straight bore with wide bore side tubes	Ten Each	ST-632 £4·90 £0·54	ST-633 £6·80 £0·76	*ax*
 ST-636 ST-637	Double oblique bore with wide bore side tubes	Ten Each	ST-636 £9·80 £1·08	ST-637 £12·00 £1·35	*ax*

STOPCOCKS 5—11 mm BORE

with individually fitted keys

Regd

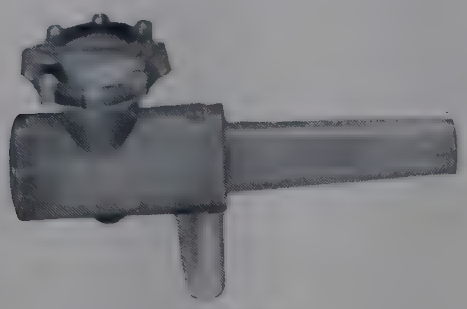
PATTERN				Soda-lime glass	Borosilicate glass	
 ST-645 ST-646	Single straight bore with wide bore side tubes	5–6 mm bore 10 mm o.d. side tube	Ten Each	ST-645 £7·20 £0·80	ST-646 £8·20 £0·92	*ax*
		7–8 mm bore 12 mm o.d. side tube	Ten Each	£10·40 £1·16	£16·00 £1·80	*ax*
		10–11 mm bore 16 mm o.d. side tube	Ten Each	£16·50 £1·85	£19·00 £2·10	*ax*

DESICCATOR STOPCOCKS see DK-469 and DK-494 in List No. sequence.

STOPCOCK RETAINING SPRINGS

ST-650
STOPCOCK RETAINING SPRINGS, rust resistant, as fitted to Ⓐ stopcocks. In pack of 10.
10 packs £1·90 Pack £0·26 *bx*

PLASTICS STOPCOCK



ST-740

ST-740

STOPCOCK, nylon, with 8 mm inlet tube at right angles to 6 mm outlet tube ... ... Each **£0·75** *cx*

SOLENOID VALVE

SOLENOID VALVE TYPE
No
INLET

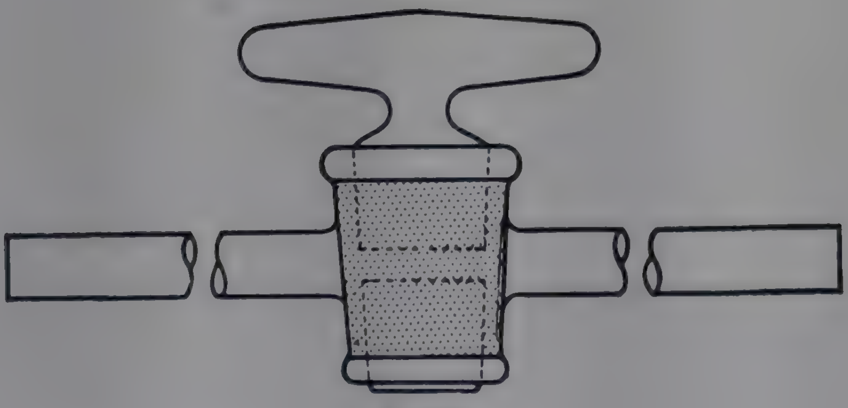
ST-760

ST-760

VALVE, solenoid, electrically operated, for ON/OFF control of flow of liquids at pressures up to 0·35 kgf/cm². A packless, **normally closed** type suitable for temperatures up to 37°C. The robust valve body and all functional parts are of PVC and ptfe making it suitable for handling a wide range of acids, alkalis, inorganic and organic chemicals and biological fluids. Polypropylene inlet and outlet nozzles, suitable for 12·7 mm bore flexible tubing, are provided. Surge current 1·75A; running current 0·23A. Overall dimensions excluding nozzles 11 cm high × 6 cm dia. For 220/240V 50 Hz single phase supplies.

Each **£13·20** *mx*

VACUUM STOPCOCKS



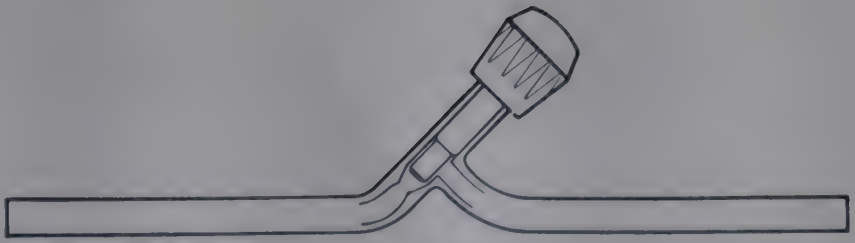
ST-800

ST-800

STOPCOCKS, vacuum, *Quickfit*, **borosilicate glass,** single straight bore with two side tubes.

Ref. No.	TH1C/1	TH1/2	TH1/3	TH1/4	
Bore of key	1	2	3	4 mm	
Bore of side tube	1·5	4	5	6 mm	
Ten	**£14·50**	**14·50**	**15·00**	**15·00**	*jx*
Each	**£ 1·65**	**1·65**	**1·70**	**1·70**	

Ref. No.	TH1/6	TH1/8	TH1/10	
Bore of key	6	8	10 mm	
Bore of side tube	7	10	12 mm	
Ten	**£20·50**	**26·50**	**32·50**	*jx*
Each	**£ 2·30**	**2·95**	**3·60**	



ST-805

ST-805

STOPCOCKS, vacuum, *Quickfit Rotaflo*, **borosilicate glass** with internal screw action ptfe plug key. Single bore with two side tubes.

Ref. No.	TF2/C1/13	TF2/13	TF2/18	TF2/24	
Bore of key	2	3	6	10 mm	
Bore of side tube	2	5	7	10 mm	
Ten	**£27·00**	**26·00**	**30·00**	**35·50**	*jx*
Each	**£ 3·00**	**2·90**	**3·40**	**4·00**	

REPLACEMENT PART

ST-807 **Plug key,** ptfe.

Ref. No.	TP1/13	TP1/18	TP1/24	
For key bore	2 and 3	6	10 mm	
Ten	**£11·50**	**16·00**	**20·00**	*jx*
Each	**£ 1·30**	**1·80**	**2·25**	

VB-770 Vacuum needle valve.

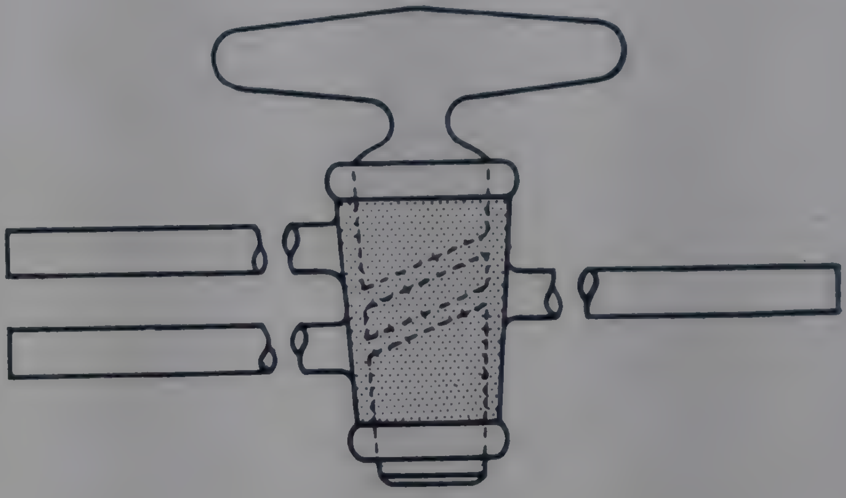
For details and price see entry in List No. sequence.

VACUUM STOPCOCKS
(continued)

ST-830

STOPCOCKS, vacuum, ***Quickfit*****, borosilicate glass,** double oblique bore with three side tubes.

Ref. No.	TH3/1	TH3/2	
Bore of key	1	3 mm	
Bore of side tube	3	5 mm	
Ten	£22·50	24·00	jx
Each	£ 2·50	2·65	



ST-830

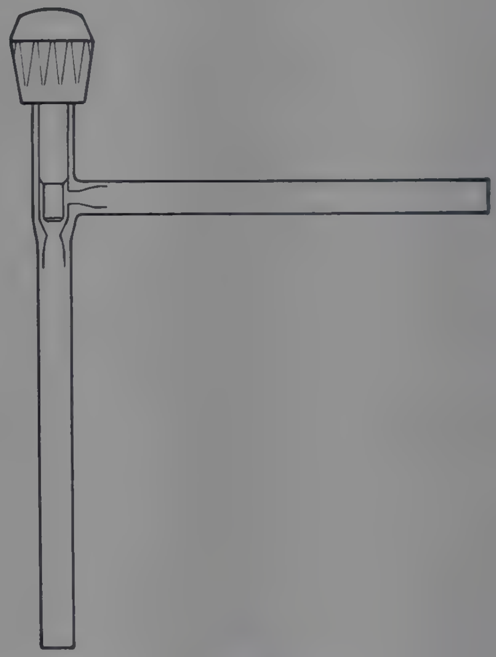
ST-845

STOPCOCKS, vacuum, ***Quickfit Rotaflo*****, borosilicate glass** with internal, screw action ptfe plug key. Single bore L-shape with side and tail tubes.

Ref. No.	TF6/13	TF6/18	TF6/24	
Bore of key	3	6	10 mm	
Bore of side and tail tubes	5	7	10 mm	
Ten	£26·00	30·00	37·00	jx
Each	£ 2·90	3·40	4·10	

REPLACEMENT PART

ST-807 **Plug key,** ptfe. For details and prices see entry in List No. sequence.

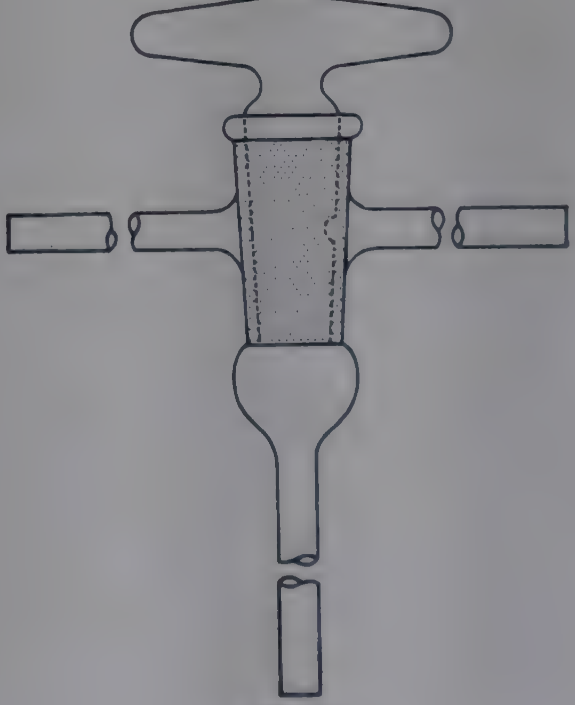


ST-845

ST-860

STOPCOCKS, vacuum, ***Quickfit*****, borosilicate glass,** L-shape, with tail and two side tubes.

Ref. No.	TH8/2	TH8/6	TH8/8	
Bore of key	2	6	8 mm	
Bore of side tube	3	8	10 mm	
Ten	£21·50	25·00	29·00	jx
Each	£ 2·40	2·80	3·30	



ST-860

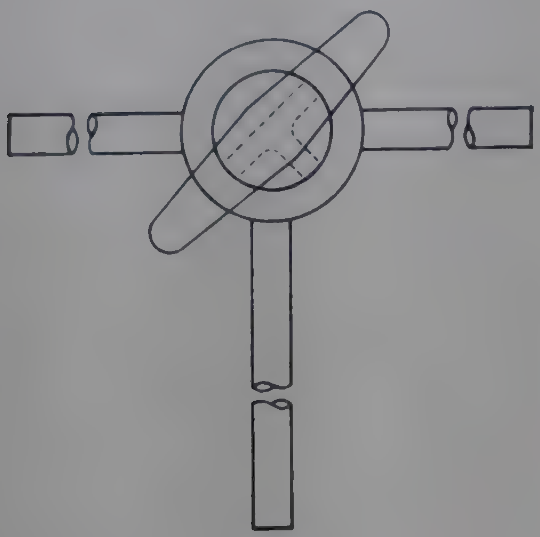
STOPCOCK LUBRICANTS

LX-210 **LX-220**	**Rubber greases.**
LX-235	**Silicone grease.**
LX-245	**Ptfe dry film.**
VB-880 et seq.	**Apiezon greases.**

For full details of applications see entries in List No. sequence.

VACUUM STOPCOCKS

(continued)

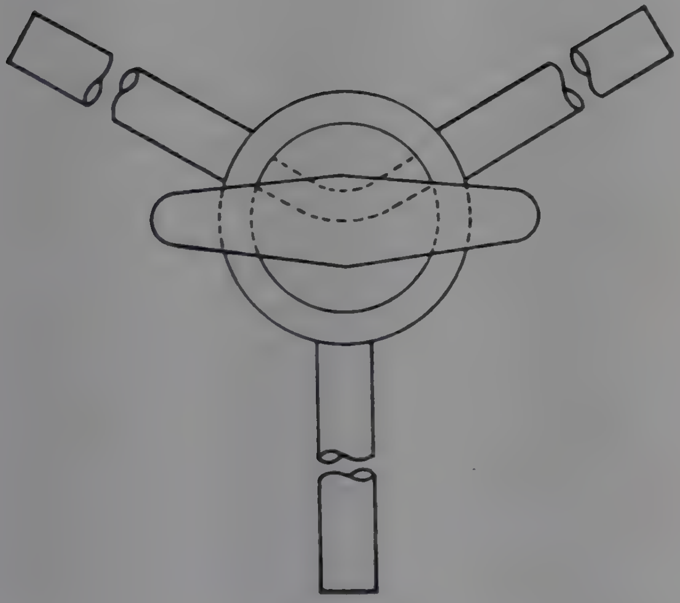


ST-870

ST-870

STOPCOCKS, vacuum, *Quickfit,* **borosilicate glass,** T-bore, with three side tubes.

Ref. No.	TH4/3	TH4/6	
Bore of key	3	6 mm	
Bore of side tube	5	8 mm	
Ten	**£24·00**	**32·50**	*jx*
Each	**£ 2·65**	**3·70**	



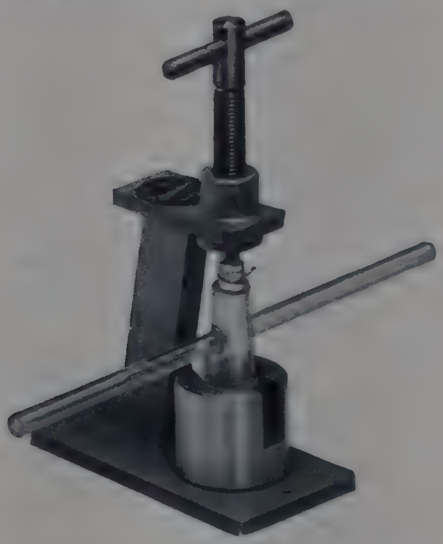
ST-880

ST-880

STOPCOCK, vacuum, *Quickfit* TH5/3, **borosilicate glass,** V-bore, with three side tubes. Bore of key 3 mm, bore of side tubes 5 mm ... Ten **£24·00** Each **£2·65** *jx*

Quickfit **stopcock adapters** see QUICKFIT APPARATUS.

STOPCOCK KEY REMOVER



ST-970

ST-970

STOPCOCK KEY REMOVER, for removing jammed stopcock keys from laboratory glassware. Comprises a strong steel frame with a steel screw and an aluminium block which is recessed to take the handle of the stopcock key. The block is tapered to accept stopcock barrels of different diameters. By exerting a steady pressure with the screw, the key may be removed ... Each **£10·00** *bx*

UNIVERSAL INDICATOR PH.3·0-11·0
HYDROCHLORIC ACID DIL.

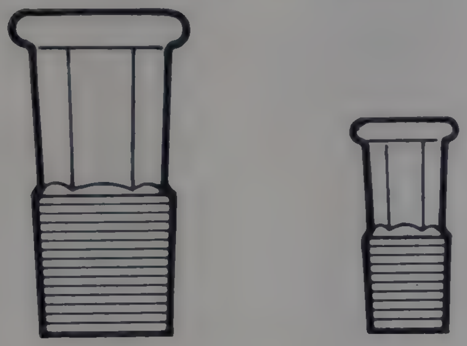
STOPPERED REAGENT BOTTLES

- **Plastics or glass stoppers**
- **Clear or amber glass bottles**
- **Capacities 30 ml to 20 litres**
- **Permanently labelled range available**

For details and prices see BT-140 to BT-465 in List No. sequence.

STOPPERS

GLASS STOPPERS


SU-520

SU-520

STOPPERS, borosilicate glass, to BS 572, with hexagonal head, suitable for *Technico* volumetric cylinders and flasks and (AG) separating funnels.

Size	10/13	12/14	14/15	16/16	
To fit cylinders	5/10	—	25/50	— ml	
To fit flasks	1 to 50	100	200/250	500 ml	
To fit sep. funnels	—	—	25	— ml	
Ten	**£2·60**	**2·80**	**2·80**	**3·00**	*cx*
Each	**£0·32**	**0·34**	**0·34**	**0·36**	

Size	19/17	24/20	29/22	
To fit cylinders	100	250/500	— ml	
To fit flasks	1000	2000	— ml	
To fit sep. funnels	50/100	250/500	1000 ml	
Ten	**£3·00**	**3·40**	**3·40**	*cx*
Each	**£0·36**	**0·40**	**0·40**	

STOPPERS, glass, to BS 572 see also *Quickfit* **apparatus.**

CORK STOPPERS see CV-010 and CV-015

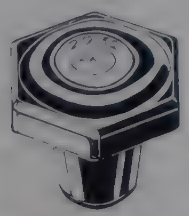
IODINE FLASK STOPPERS
see *Quickfit* Apparatus

SEALING MATERIALS

Silicone rubber	see PP-495
Parafilm	see PP-522 and PP-524
Ptfe type	see PP-525

For details and prices see entries in List No. sequence.

PLASTICS STOPPERS


SU-700, SU-710, SU-712

SU-718

SU-700

STOPPERS, (AG), polypropylene, to BS 572 closed at lower end, with hexagonal head. Coloured red with grey disk insert. Suitable for *Technico* volumetric cylinders and flasks and (AG) separating funnels. These stoppers may be autoclaved. Supplied in packs of 6 stoppers of 1 size.

Size	10/13	12/14	14/15	
To fit cylinders	5/10	—	25/50 ml	
To fit flasks	1 to 50	100	200/250 ml	
To fit sep. funnels	—	—	25 ml	
10 packs	**£2·90**	**3·10**	**3·20**	*bx*
Pack	**£0·35**	**0·37**	**0·38**	

Size	16/16	19/17	24/20	
To fit cylinders	—	100	250/500 ml	
To fit flasks	500	1000	2000 ml	
To fit sep. funnels	—	50/100	250/500 ml	
10 packs	**£3·30**	**3·70**	**4·00**	*bx*
Pack	**£0·39**	**0·43**	**0·45**	

SU-710

STOPPERS, (AG), polypropylene, to BS 572, with hexagonal head and closed lower end. Coloured red with grey disk insert. These stoppers may be autoclaved and are suitable for reagent bottles BT-140, BT-142, BT-400, BT-402 and other apparatus with corresponding joint sizes. Supplied in packs of 6 stoppers of 1 size.

Size	19/22	24/29	29/32	
10 packs	**£3·20**	**3·50**	**4·20**	*bx*
Pack	**£0·38**	**0·41**	**0·47**	

SU-712

STOPPERS, (AG), polypropylene, to BS 572, as SU-710 but in other colours suitable for colour coding. Available in yellow or blue, both with grey disk insert. Supplied in packs of 4 stoppers of 1 size, all the same colour.

Size	19/22	24/29	29/32	
10 packs	**£2·70**	**3·00**	**3·70**	*bx*
Pack	**£0·33**	**0·36**	**0·43**	

When ordering please state colour required.

***SU-718**

STOPPERS, polypropylene, with hexagonal head having two 8 mm dia. nozzles for connection to flexible tubing. One nozzle is fitted with an 8 mm dia. tube which extends for approx. 10 mm below the hollow cone.

Size	29/32	34/35	
Ten	**£2·30**	**2·60**	*mx*
Each	**£0·29**	**0·32**	

RUBBER STOPPERS

Gallenkamp
RUBBER STOPPERS to BS 2775
List No. SU-760
Type SOLID
Quantity 12
Size 19
LONDON—WIDNES—STOCKTON-ON-TEES
MADE IN ENGLAND

SU-760

BORING HOLES IN RUBBER STOPPERS

Stoppers SU-760, SU-780 and SU-800 can be supplied to order with holes bored to customer requirements. The price quoted below is additional to the cost of the stoppers and the quantity rate applies only to 10 or more stoppers each bored with the same size of hole.

10 holes **£0·50** Each hole **£0·13** *cxN*

BORERS for rubber stoppers—see CV-100 et seq. in List No. sequence.

SOLID STOPPERS TO BS2775

Each stopper is numbered with a size which corresponds to the diameter of the small end in mm.

SU-760

STOPPERS, solid, natural red rubber, sizes 3 to 105.

SU-762

STOPPERS, rubber, solid. Stoppers SU-760 in pack of assorted sizes from 5 mm to 25 mm as follows:
12 each, size Nos 9, 10, 11, 13.
8 each, size Nos 7, 8, 15.
6 each, size Nos 5, 6, 17, 19.
4 each, size Nos 21, 23, 25.

10 packs **£19·00** Pack **£2·10** *cx*

SU-765

STOPPERS, one hole, natural red rubber, sizes 5 to 43.
Hole diameter; 3 mm for sizes 5 and 6.
4 mm for sizes 7 and 8.
5 mm for sizes 9 to 43.

SU-780

STOPPERS, solid grey synthetic rubber (neoprene), free from sulphur. Sizes 3 to 43.

SU-800

STOPPERS, solid, silicone rubber, non-toxic, translucent, will withstand sterilisation. Sizes 3 to 33.

For prices of SU-760, SU-765, SU-780 and SU-800 see facing page.

SUBA SEAL STOPPERS

SU-820

SU-820

STOPPERS, *Suba-seal*, **recessed top, silicone rubber,** non-toxic, translucent. Suitable for closing tubes and may be autoclaved. With serrations to grip the sides of the tube and a lip to assist removal. The top can be pierced by a hypodermic needle. In packs of 10.

Size No.	15	20	30	36	51	70	
Diameter	8·7	10·7	15	17	23	35·6 mm	
10 packs	**£4·60**	**5·10**	**7·40**	**7·80**	**17·50**	**25·50**	*cx*
Pack	**£0·51**	**0·56**	**0·82**	**0·86**	**1·95**	**2·80**	

SU-850

SU-850

STOPPERS, *Suba-seal*, **rubber,** for narrow mouth containers, with turnover flange and serrations. In packs of 10.

Size No.	9	13	17	21	
Bottom diameter	6·5	8	9·5	11 mm	
10 packs	**£1·85**	**1·95**	**2·15**	**2·40**	*cx*
Pack	**£0·25**	**0·26**	**0·28**	**0·30**	

Size No.	25	29	33	37	
Bottom diameter	12·5	14	16	17·5 mm	
10 packs	**£2·60**	**2·90**	**3·30**	**4·80**	*cx*
Pack	**£0·32**	**0·35**	**0·39**	**0·53**	

Size No.	41	45	49	
Bottom diameter	19	20·5	22 mm	
10 packs	**£5·60**	**6·60**	**9·00**	*cx*
Pack	**£0·62**	**0·72**	**1·00**	

RUBBER STOPPERS

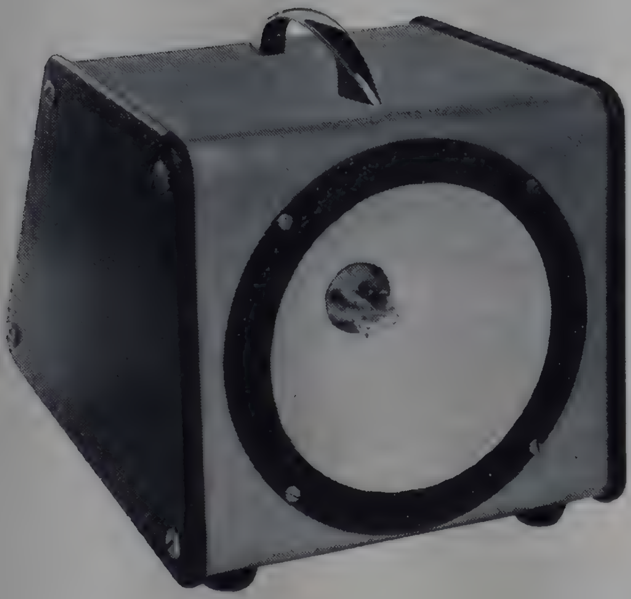
DIMENSIONS AND PRICES

When ordering please state List No. and stopper Size No.

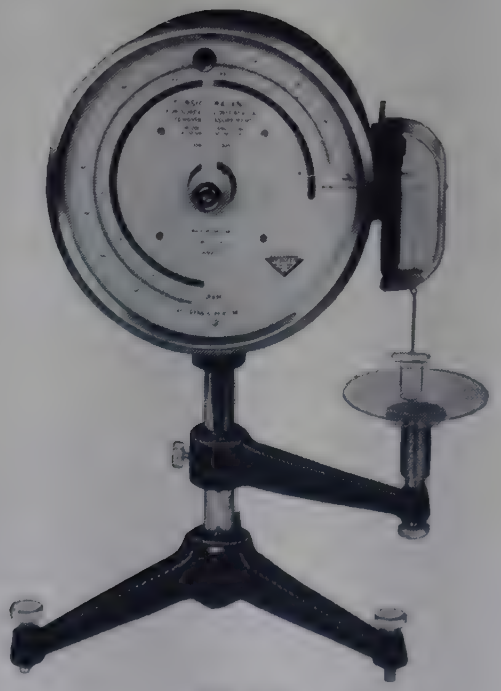
Stopper Size No.	Dimensions			SU-760		SU-780		SU-800	
	Bottom dia. mm	Top dia. mm	Height mm	10 packs	Pack of 12	10 packs	Pack of 12	10 packs	Pack of 12
				£	£	£	£	£	£
3	3	4·5	12	1·06	0·18	1·30	0·20	4·00	0·45
4	4	5·8	14	1·06	0·18	1·30	0·20	4·00	0·45
				SU-760 and SU-765					
5	5	7	16	1·06	0·18	1·30	0·20	4·00	0·45
6	6	8	16	1·06	0·18	1·40	0·21	4·50	0·50
7	7	9	16	1·16	0·19	1·50	0·22	5·60	0·62
8	8	10·5	20	1·16	0·19	1·50	0·22	8·40	0·94
9	9	11·5	20	1·30	0·20	1·60	0·23	10·00	1·10
10	10	12·5	20	1·40	0·21	1·70	0·24	12·00	1·35
11	11	14	24	1·50	0·22	1·80	0·25	19·50	2·20
13	13	16	24	1·60	0·23	1·90	0·25	22·50	2·50
								Twelve	Each
								£	£
15	15	18	24	1·70	0·24	2·00	0·27	2·90	0·31
17	17	20·3	26	2·00	0·26	2·50	0·32	4·50	0·50
19	19	22·5	28	2·40	0·30	2·80	0·34	5·30	0·50
21	21	24·5	28	3·20	0·38	3·70	0·43	5·80	0·54
23	23	26·5	28	3·60	0·41	4·30	0·47	6·80	0·64
25	25	28·5	28	4·40	0·49	5·10	0·58	7·80	0·74
27	27	31	32	5·40	0·60	6·20	0·68	10·40	0·96
29	29	33	32	6·40	0·70	7·20	0·80	11·60	1·08
31	31	36	35	9·40	1·04	10·60	1·18	16·00	1·50
33	33	38·5	38·5	10·20	1·12	11·80	1·35	18·00	1·70
35	35	40·5	38·5	11·40	1·30	12·60	1·40		
37	37	42·5	38·5	12·60	1·40	13·00	1·45		
39	39	44·5	38·5	13·40	1·50	14·80	1·65		
41	41	47	42	14·00	1·55	16·50	1·85		
43	43	49	42	15·50	1·75	18·50	2·05		
				SU-760					
				Twelve	Each				
				£	£				
45	45	51	42	1·80	0·22				
49	49	55	42	2·10	0·24				
53	53	59·5	45·5	2·60	0·28				
57	57	64	49	3·20	0·33				
62	62	69	49	4·20	0·41				
67	67	74	49	5·20	0·48				
71	71	78	49	5·80	0·54				
75	75	85	54	8·40	0·78				
79	79	89	54	9·00	0·84				
86	86	96	54	10·00	0·94				
92	92	102	54	11·80	1·10				
99	99	109	54	13·00	1·20				
105	105	116·5	63·5	14·40	1·35				

All items on this page are coded cx.

SV-800 front



SV-800 rear



SX-530

STROBOSCOPE

SV-800

STROBOSCOPE, *Flash-Tac,* a portable instrument **fitted with a Xenon flash tube** giving 100 to 15,000 flashes/minute in three ranges. Flash duration 1 to 20 μs, and light intensity 50 to 100 lux depending upon range. Flash speeds are indicated on a directly calibrated scale accurate to within ±3%. External triggering facilities are provided. The flash tube and 12 cm reflector are at the rear of the instrument.
Dimensions 25×20×18 cm. Weight 4·5 kg.
For 200/250V 50 Hz single phase supplies.
Each **£42·00** *fx*

TACHOMETER, range 0 to 50,000 rev/min. For details and price see TB-020 in List No. sequence.

STOPWATCHES	see Timers
STRIP ACTION WATER STILL	see Distillation
STRIP CHART RECORDER	see Electrical Instruments
STUDENT BALANCES	see Balances
SUBLIMATION APPARATUS	see Distillation
SUGAR FLASKS	see Flasks
SULPHONATION FLASK	see Petroleum
SULPHUR OXIDES GAS ANALYSER	see Gas Analysers
SUPPORT FRAMES	see Stands and Clamps

SURFACE TENSION AND INTERFACIAL TENSION BALANCE

For rapid direct reading determinations using either the ring or the glass plate test methods.

Construction

The balance is for 4 cm circumference rings and 4 cm edge glass plates and is scaled 0 to 0·12 Newtons/metre in 12 divisions and 0 to 1 g in 500 divisions. Scale accuracy is ±0·4%. The balance has polished hardened steel pivots mounted in spring loaded jewelled bearings. Eddy current damping brings the pointer rapidly to rest. A quick action locking device enables the beam to be clamped regardless of pointer position and so can save time by avoiding having to return to zero between consecutive determinations. The balance is fitted with zero adjuster, spirit level and levelling feet. The construction allows the apparatus also to be used as an ordinary 1 g balance.

Operation

The liquid under examination is placed in a dish on a small platform supported by an arm extending from the balance column. Coarse adjustment is by the screw clamping this arm and fine adjustment by another screw beneath the platform. The platinum wire ring or glass test plate is suspended from the balance hook through a small hole in the transparent cover which protects the balance arm.
The ring or plate is brought into contact with the liquid and, as it is gradually drawn away from the surface, the force resulting from surface tension may be read directly from the balance scale.

SX-530

SURFACE AND INTERFACIAL TENSION BALANCE, as specification, including platinum ring and glass test plate each with a weight-compensating extension hook, concave dish, two glass beakers and instructions manual ... ... Each **£85·90** *fx*

REPLACEMENT PART

SX-534 Platinum ring ... ... Each **£11·25** *fx*

SYRINGES

***SY-410**

SYRINGES, glass, for liquids, heat resistant glass with calibrations indelibly marked. Pistons and barrels from any one size are interchangeable. **Without needle,** accepts any Luer fitting needle.

Capacity	1	2	5	10	20 ml	
Subdivision	0·1	0·2	0·2	0·2	1·0 ml	
Ten	**£3·20**	**3·20**	**5·10**	**7·00**	**9·20**	*cx*
Each	**£0·38**	**0·38**	**0·57**	**0·78**	**1·02**	

SY-430

SYRINGES, plastics, disposable, for gases or liquids, radiation sterilised. With polystyrene barrel and plunger and surgical rubber piston coated with silicone lubricant. Each syringe is packed in a sealed envelope. The 1 ml size is the tuberculin type, the others are to BS 1263. **Without needle,** accepts any Luer fitting needle. In packs of 25.

Capacity	1	2	5	10 ml	
Subdivided	0·01	0·2	0·5	1 ml	
4 packs	**£4·50**	**2·60**	**4·60**	**5·70**	*cx*
Pack	**£1·20**	**0·70**	**1·25**	**1·50**	

ACCESSORY NEEDLES FOR SY-410 and SY-430

SY-432 **Syringe needles, disposable,** stainless steel, with polystyrene Luer fitting, radiation sterilised. Each needle packed with protective sheath in sealed envelope. In packs of 25.

Size	Hypo 20	15	1	Serum II	
Gauge	25	23	21	19	
Length	16	25	38	51 mm	
4 packs	**£1·80**	**1·80**	**1·80**	**2·50**	*cx*
Pack	**£0·48**	**0·48**	**0·48**	**0·66**	

MICRO SYRINGES

***SY-500**

SYRINGE, 50 µl, glass and stainless steel, for liquids. With heat resistant glass barrel having indelibly marked calibrations with subdivisions to 1 µl and stainless steel plunger. **Without needle,** accepts any Luer fitting needle ... ... Each **£5·00** *mx*

***SY-520**

SYRINGE, 500 µl, glass and ptfe, for gases. With heat resistant glass barrel having indelibly marked calibrations with subdivisions to 10 µl and ptfe piston. **Without needle,** accepts any Luer fitting needle. Each **£8·50** *fx*

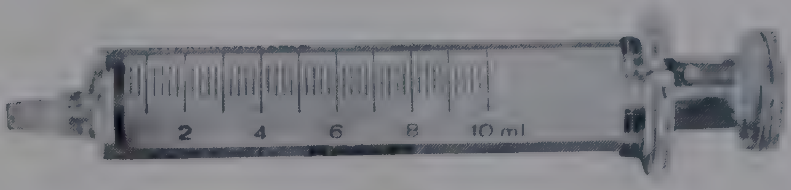
ACCESSORY NEEDLE FOR SY-500 and SY-520

***SY-550** **Syringe needle,** tapered, stainless steel with nickel plated brass Luer fitting. Tip has 0·15 mm bore and 17° point to minimise damage to septa ... Each **£0·70** *fx*

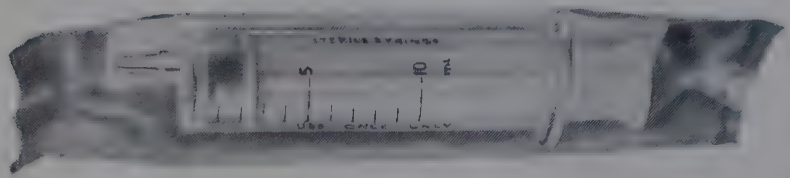
TACHOMETER

TB-020

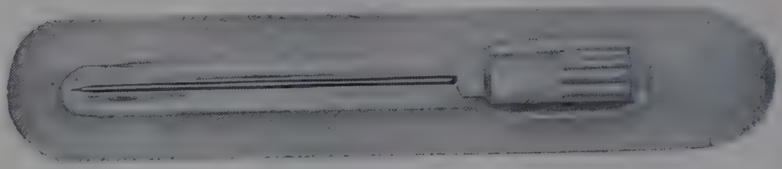
TACHOMETER, for measuring speed of rotation in either direction. The scale is graduated 0–500 rev/min, and a ×10, ×100 range switch enables readings to be made up to 50,000 rev/min, complete with pointer lock enabling readings to be taken after withdrawal, male and female hard rubber centres, 7·5 cm extension piece, and disk attachment for surface speed measurement. In protective case ... ... Each **£27·50** *fx*



SY-410



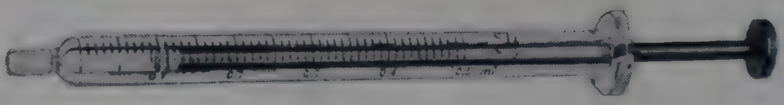
SY-430



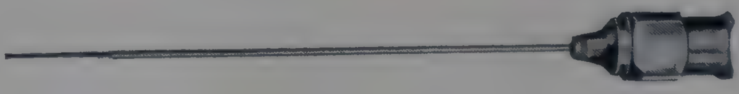
SY-432

SYRINGES, Agla pipette see PM-566
SYRINGE NEEDLES, long see CL-945
SYRINGE, gas sampling see GF-415
For details see entries in List No. sequence.

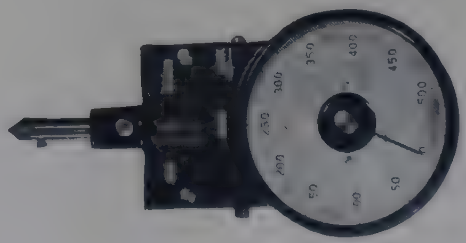
SY-500



SY-520



SY-550



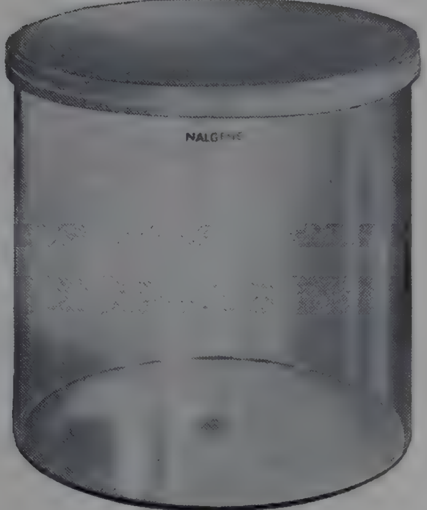
TB-020

Tally counters see COUNTERS in List No. sequence.
Stroboscopes see SV-800 in List No. sequence.

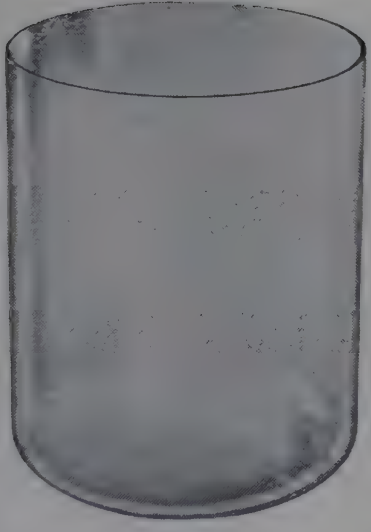
TANKS

(Dimensions and capacities given below are approximate)

TB-550



TB-580



TB-600

TB-650

TANKS, glass see GD-245
polythene see WD-425
For details and prices see entries in List No. sequence.

*TB-550

TANKS, glass, rectangular, suitable for use as aquaria.

Capacity	1·75	3	5·5	9 litres	
Height	12·5	15	17·5	20 cm	
Length	17·5	20	25	30 cm	
Width	12·5	15	17·5	20 cm	
Ten	**£17·50**	22·00	28·00	45·00	*cx*
Each	**£ 1·95**	2·45	3·10	5·00	

Capacity	14	25	35	48 litres	
Height	22·5	27·5	30	30 cm	
Length	35	40	45	60 cm	
Width	22·5	27·5	30	30 cm	
Ten	**£60·00**	—	—	—	*cx*
Each	**£ 6·40**	10·50	16·00	21·00	

BL-101

TANKS, iron frame nylon coated, suitable for use as aquaria. For details and prices see entry in List No. sequence.

ACCESSORIES for aquaria

AF-300 et seq.	Aerators	For details and prices see entries in List No. sequence.
BL-110	Diffuser	
BL-125	Heater	
BL-135	Thermostat	

*TB-580

TANKS, polycarbonate, transparent, circular. Can be used at temperatures up to 135°C. Complete with polypropylene covers.

Capacity	9	20 litres	
Diameter	22	31 cm	
Height	25	31 cm	
Each	**£6·50**	**14·00**	*mx*

TB-600

TANKS, *Pyrex* glass, circular, with ground edge. Suitable for use as thermostat baths.

Capacity	12	30 litres	
Diameter	25	30 cm	
Height	30	45 cm	
Wall	3–6	5–8 mm	
Each	**£7·40**	**14·90**	*jx*

ACCESSORIES for thermostat baths

TM-840	Thermo Stirrer 1, *Gallenkamp*	For details and prices see entries in List No. sequence.
TM-860	Thermo Stirrer 2, *Gallenkamp*	
WF-380	Spheres, to reduce evaporation	

TB-650

TANKS, rigid polythene, rectangular.

Capacity	54	90	145 litres	
Height	29	45	48 cm	
Length	58	45	64 cm	
Width	44	45	47 cm	
Each	**£8·70**	**12·00**	**14·20**	*cx*

Gallenkamp THERMO STIRRERS

For converting suitable containers into temperature controlled water and oil baths. Both models incorporate heaters, thermostats and efficient stirrers which can be converted into pumps for the external circulation of water at controlled temperatures.

- **Temperature range from ambient plus 5degC to 100°C**
- **Quiet and reliable operation**
- **Suitable for a wide range of bath sizes**

TM-840

THERMO STIRRER 1

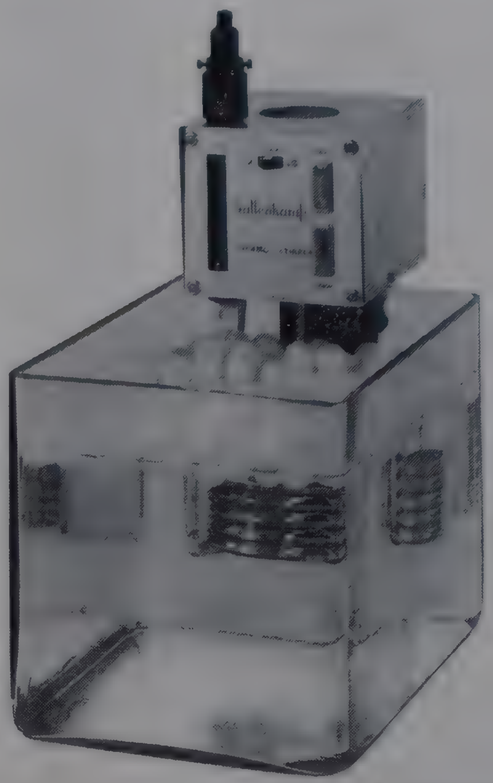
- Direct reading *Compenstat* temperature control.
- 1500W sheathed immersion heater.
- Temperature fluctuation 0·4degC or less.

TM-860

THERMO STIRRER 2

- Temperature controlled by contact thermometer and solid state relay.
- 1000W standard and 1500W accessory heaters.
- Temperature fluctuation 0·05degC or less.

For details and prices see entries in List No. sequence.



Thermo Stirrer mounted on tank TB-550 and including spheres WF-380

TEST PAPERS

TEST PAPERS, pH indicator, pack of 10 books each of 20 leaves measuring 65×10 mm.

List No.	Indicator	pH range	Colour change	10 packs	Pack	
				£	£	
TE-014	Litmus, red	5 to 8	Red-blue	2·10	0·27	*mx*
TE-015	Litmus, blue	5 to 8	Blue-red	2·10	0·27	*mx*

TEST PAPERS, pH indicator, wide range, pack of 10 books each of 20 leaves measuring 65×10 mm. With colour chart on book cover showing colour changes in steps of 1·0 pH.

List No.	pH range	10 packs	Pack	
		£	£	
TE-041	1 to 11	3·10	0·37	*mx*

TEST PAPERS, miscellaneous, pack of 10 books each of 20 leaves measuring 67×12·5 mm.

List No.	Indicator	Application	Colour change	10 packs	Pack	
				£	£	
TE-050	Cobalt chloride	Moisture	Pink-blue	2·15	0·28	*mx*
TE-051	Lead acetate	Hydrogen sulphide	White-black	2·15	0·28	*mx*
TE-053	Starch-iodide	Oxidising agents	White-blue	2·15	0·28	*mx*

TEST PAPERS, pH and miscellaneous, *Whatman-BDH*, in **reel dispensers** with colour reference chart on side, containing 5 metres of 10 mm wide paper.

List No.	Indicator	Application	Colour change	Ten	Each	
				£	£	
TE-070	—	pH 1 to 14	As reference chart	2·80	0·34	*mx*
TE-074	—	pH 1 to 4		2·60	0·32	*mx*
TE-075	—	pH 4 to 6		2·60	0·32	*mx*
TE-076	—	pH 6 to 8		2·60	0·32	*mx*
TE-077	—	pH 8 to 10		2·60	0·32	*mx*
TE-078	—	pH 10 to 12		2·60	0·32	*mx*
TE-079	—	pH 12 to 14		2·60	0·32	*mx*
TE-085	Litmus, red	pH 5 to 8	Red-blue	2·60	0·32	*mx*
TE-086	Litmus, blue	pH 5 to 8	Blue-red	2·60	0·32	*mx*
TE-090	Phenolphthalein	pH 8·5 to 10	Colourless-red	2·60	0·32	*mx*
TE-092	Congo red	pH 3 to 5	Violet-orange	2·60	0·32	*mx*
TE-100	Lead acetate	Hydrogen sulphide	White-black	2·80	0·34	*mx*
TE-105	Starch-iodide	Oxidising agents	White-blue	2·80	0·34	*mx*

OTHER APPARATUS FOR pH MEASUREMENT

Lovibond nessleriser	see	**CT-840** et seq.
Lovibond comparator	see	**CT-700** et esq.
pH meters	see	**EJ-460** et seq.
BDH soil testing outfit	see	**SH-140**

TEST TUBES

SODA-LIME GLASS

TF-100

TEST TUBES, soda-lime glass, normal wall, with rims. (BS 3218 light wall thickness).

Dimensions mm	Pack qty.	10 packs	Pack	
		£	£	
50 × 6	144	**6·00**	**0·66**	cx
75 × 10	144	**6·60**	**0·74**	cx
75 × 12	144	**7·00**	**0·78**	cx
100 × 12	72	**4·00**	**0·45**	cx
100 × 16	72	**5·20**	**0·58**	cx
125 × 12	72	**4·80**	**0·53**	cx
125 × 16	72	**5·70**	**0·64**	cx
150 × 16	72	**6·80**	**0·76**	cx
150 × 19	72	**8·60**	**0·96**	cx
150 × 25	72	**12·80**	**1·45**	cx
175 × 30	72	**34·00**	**3·80**	cx

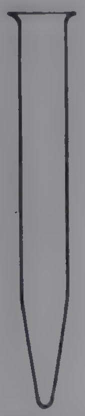
TF-104

TEST TUBES, soda-lime glass, heavy wall, rimless, bacteriological grade. The 75 × 12 mm tube is suitable for the Kahn test.

Dimensions mm	Pack qty.	10 packs	Pack	
		£	£	
75 × 10	144	**8·20**	**0·92**	cx
75 × 12	144	**8·60**	**0·96**	cx
100 × 12	72	**5·40**	**0·60**	cx
100 × 16	72	**6·00**	**0·66**	cx
125 × 12	72	**6·20**	**0·70**	cx
125 × 16	72	**7·80**	**0·86**	cx
150 × 16	72	**8·80**	**0·98**	cx
150 × 19	72	**10·80**	**1·20**	cx
150 × 25	72	**18·00**	**2·00**	cx
175 × 30	72	**37·00**	**4·10**	cx

TF-100
TF-180
TF-184

TF-104
TF-122
TF-128
TF-182
TF-186



TF-123

NEUTRAL RESISTANCE GLASS

TF-122

TEST TUBES, Durham fermentation, to BS 625, **neutral resistance glass,** rimless.

Length	30	35	50 mm	
Diameter	6	8	7·5 mm	
Pack qty.	288	288	144	
Pack	**£2·10**	**2·50**	**1·40**	cx

TF-123

TEST TUBE, Dreyer, to BS 625, **neutral resistance glass,** with rim. Dimensions 60 × 7 mm in pack of 144.

Pack **£3·80** cx

TF-128

TEST TUBES, neutral resistance glass, medium wall, rimless, bacteriological grade, nominal wall thickness 0·75 mm. Coefficient of expansion $5 \cdot 1 \times 10^{-6}$.

Dimensions mm	Pack qty.	10 packs	Pack	
		£	£	
75 × 10	144	**12·20**	**1·35**	cx
100 × 12	72	**9·20**	**1·02**	cx
100 × 16	72	**11·00**	**1·25**	cx
125 × 16	72	**12·20**	**1·35**	cx
150 × 16	72	**13·80**	**1·55**	cx
150 × 19	72	**19·50**	**2·15**	cx
150 × 25	72	**25·00**	**2·80**	cx

Test tubes for special purposes are shown elsewhere in the catalogue as indicated below. Full details are given in List No. sequence.

	List No.
Colorimetry	
Test tube, uniform diameters	CS-270
Culture Apparatus	
Test tube, tissue culture	CX-465
Test tube, Leighton	CX-470, CX-472
Dairy Products	
Test tube, methylene blue test	DB-220
Test tube, solubility index	DE-600
Petroleum and Allied Products	
Test tube, drop point IP 31	PE-822
Test tube, drop point ASTM D 566–IP 132	PE-830

TEST TUBES

BOROSILICATE GLASS

TF-180
TEST TUBES, *Pyrex* **glass,** light wall, with rims.

TF-182
TEST TUBES, *Pyrex* **glass,** light wall, rimless.

TF-184
TEST TUBES, *Pyrex* **glass,** medium wall, with rims.

TF-186
TEST TUBES, *Pyrex* **glass,** medium wall, rimless.

For illustrations TF-180 to TF-186 see opposite page.

List Nos.		TF-180 and TF-182		TF-184 and TF-186		
Dimensions mm	Std. pack qty.	Std. pack	12 tubes	Std. pack	12 tubes	
		£	£	£	£	
75×10	144	2·25	0·25	3·30	0·34	jx
75×12	144	2·40	0·26	3·75	0·38	jx
100×12	144	2·95	0·31	3·85	0·38	jx
100×16	144	4·55	0·44	—	—	jx
125×16	144	3·95	0·39	6·55	0·62	jx
150×12	144	3·45	0·35	—	—	jx
150×16	144	4·45	0·43	6·80	0·64	jx
150×19	144	4·90	0·46	7·90	0·74	jx
150×24	144	6·65	0·62	10·65	1·00	jx
180×18	144	5·00	0·47	—	—	jx
200×24	72	4·55	0·82	—	—	jx
200×32	72	11·05	2·05	15·35	2·80	jx
200×38	36	7·40	2·60	8·45	3·00	jx

TF-280
TEST TUBES, borosilicate glass, with ground neck to take glass stoppers SU-520 or plastics stoppers SU-700.

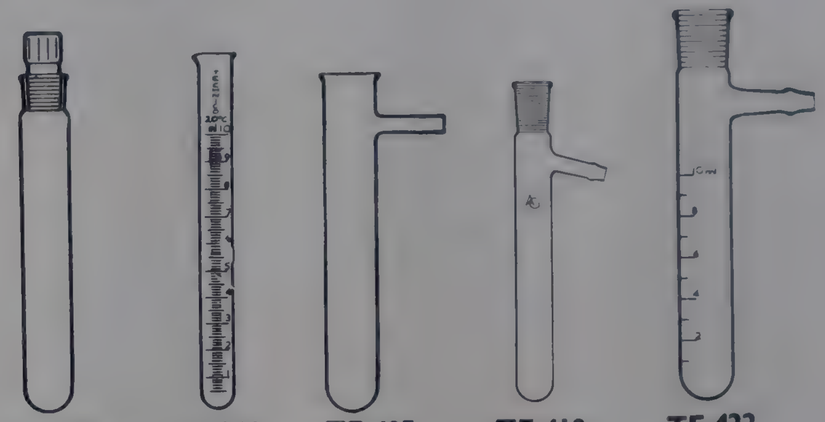
Length	100	125	150 mm	
Diameter	12	16	22 mm	
Neck size	10/13	14/15	19/17	
Ten	£1·40	1·60	1·90	ax
Each	£0·21	0·23	0·26	

ACCESSORIES

SU-520	**Stoppers,** hollow blown glass.	For details and prices see entries in List No. sequence.
SU-700	**Stoppers,** polypropylene.	

TF-350
TEST TUBE, (AG), **borosilicate glass,** graduated. Capacity 10 cm³ subdivided 0·1 cm³.
Ten £3·90 Each £0·45 *ax*

STOPPERED TEST TUBES see also QUICKFIT APPARATUS.



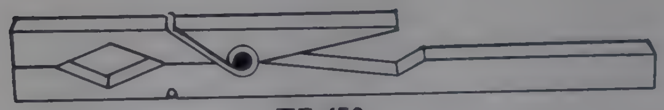
TF-405
TEST TUBES, (AG), **borosilicate glass,** with side arm.

Length	125	150	150 mm	
Diameter	15	20	26 mm	
Ten	£1·60	1·70	2·10	ax
Each	£0·23	0·24	0·27	

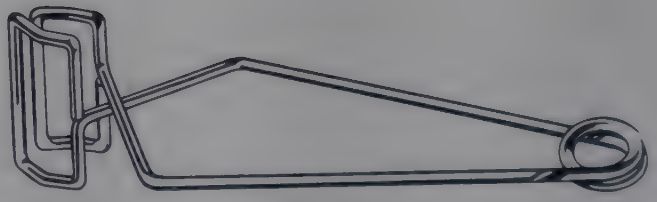
TF-410
TEST TUBE, (AG), **borosilicate glass,** with 19/26 socket and sidearm suitable for use with Hirsch funnels FM-963 and FM-964. Length 150 mm, diameter 20 mm.
Ten £5·80 Each £0·64 *ax*

TF-422
TEST TUBE, (AG), **borosilicate glass,** graduated 0 to 10 cm³ in 1·0 cm³, with 14/15 socket and sidearm, as used in (AG) small scale preparative sets DT-760 and DT-765.
Ten £7·00 Each £0·78 *ax*

ACCESSORIES



TF-450



TF-455

TF-450
TEST TUBE HOLDER, hardwood, with wire spring. Overall length 20 cm. Accepts tubes up to 25 mm dia.
In pack of 10 ... 10 packs £6·20 Pack £0·70 *cx*

TF-455
TEST TUBE HOLDER, spring steel, nickel plated. Overall length 15 cm. Accepts tubes up to 32 mm dia.
In pack of 10 ... 10 packs £16·00 Pack £1·80 *cx*

Test tube brushes see BU-550 to BU-562
stands see SM-822 to SM-885
tongs see TS-250
For details see entries in List No. sequence.

THERMOMETERS

GENERAL INFORMATION

Mercury-in-glass thermometers are still the most convenient devices for measuring temperature quickly and with reasonable accuracy. Alcohol, pentane and toluene are used to fill low temperature thermometers but such thermometers do not have the same accuracy as mercury thermometers.

ENGRAVED STEM THERMOMETERS

These comprise selected glass tubes, of very fine and uniform bores, sealed to bulbs, the scales being engraved directly onto the stems.

ENCLOSED OPAL GLASS SCALE THERMOMETERS

These thermometers comprise capillary tubes of small outside diameters, sealed to bulbs and the stems so produced anchored to scales made of opal glass. The capillaries and scales are both enclosed in outer protective glass tubes.

IMMERSION DEPTH

Most standard thermometers are calibrated to give a correct reading of temperature when the liquid in the thermometer is completely immersed in the medium being tested. In theory that part of the stem above the fluid level in the thermometer should be immersed, but in practice it is necessary to have the thermometer fluid level slightly above the sample level in order to read the thermometer. Partial immersion thermometers are calibrated to read correctly when immersed up to a definite point indicated on the stem. In theory, the temperature of vapour surrounding the emergent portion should be the same as during standardisation and calibration, but this condition is difficult to obtain. Thus, total immersion thermometers are considered more accurate although if insufficiently immersed these thermometers will read low for temperatures above the surroundings and vice-versa. **All standard thermometers are calibrated for total immersion unless otherwise stated.**

TEST CERTIFICATES

The testing of liquid-in-glass thermometers is shared by the British Standards Institution and the National Physical Laboratory and the BST and NPL certificates issued respectively by these authorities are of equal standing. Both authorities accept thermometers which are manufactured to conform with the appropriate British Standard or other recognised specifications for testing and retesting. Such thermometers are provided with certificates which give corrections at 5 or more points according to the type and accuracy of the thermometer. A test certificate is a verification of the accuracy of a thermometer and not a guarantee of correct functioning. Thermometers should be re-tested at intervals not exceeding five years, or more frequently if determination of the zero or other suitable fixed point indicates that a re-test is required.

Users may submit thermometers direct to the BSI or NPL. Further details of the procedure are given in Test Leaflet TL12 issued by the British Standards Institution, Maylands Avenue, Hemel Hempstead, Hertfordshire, England.

STORAGE OF THERMOMETERS

Those thermometers having ranges entirely below ambient temperature should if possible, be stored vertically with the bulbs downwards. Spirit thermometers should always be stored away from direct sunlight. Thermometers after usage should be allowed to reach air temperature before storage.

CARE OF LIQUID-IN-GLASS THERMOMETERS

Liquid-in-glass thermometers are liable to develop faults during transit or when otherwise subjected to undue vibration. The following is a summary of the defects which are likely to occur and the best remedial procedures which can be carried out by the user.

Gas trapped in bulb. First tap any bubbles of gas into the top of the bulb then cool the bulb by immersion in a suitably cold medium, until the mercury contracts sufficiently for the trapped gas to be forced above the mercury. It may be necessary to heat and cool the thermometer two or three times to do this. Should a thermometer need cooling to very low temperatures for this purpose (see RJ-550 Freezer Aerosol in List No. sequence), it should not be shaken or vibrated while the mercury is frozen solid.

Gas trapped in contraction chamber. The mercury can be cooled as described above until the gas is above the mercury.

Divided column. The parts may be rejoined by cooling as described above.

Detached mercury at the top of contraction chamber. It is necessary to cool the bulb until mercury comes down into the contraction chamber. The side of the stem should be gently tapped until the detached mercury forms a globule on the wall of the contraction chamber. By gently heating the bulb this mercury can be rejoined to the main column.

Detached mercury in expansion chamber. Tap the top of the stem until the detached mercury collects on the top of the capillary. Heat the thermometer bulb, taking great care if the thermometer is a high temperature one. As the expanding mercury forces gas into the expansion chamber continue to tap the stem in order to keep the detached mercury on top of the capillary.

Mercury in U-tube of Beckmann thermometer. For safety in transit, the U-shaped capillary, at the top of Beckmann thermometers, is frequently almost filled with mercury. To rejoin this mercury to the main column so that zero can be set at the required point, the top of stem just below the metal cap is gently warmed until the mercury in the U-capillary expands thereby driving some into the bore. All the mercury should then siphon into the bulb and fill the bore. The trapped gas can then be cleared by the cooling method already described.

APPARATUS FOR CALIBRATION OF THERMOMETERS AND PYROMETERS

Furnaces	see	FS-400
Calibrating oil bath	see	OD-050
Potentiometers	see	EF-628
Thermocouple test set	see	PX-375
Thermostatic baths	see	VS-615, VS-670

For details and prices see entries in List No. sequence.

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Soil	see SH-210
Standard joint	see *Quickfit* apparatus

For details and prices see entries in List No. sequence.

TEMPERATURE CONVERSION TABLE

(Sauveur's Arrangement)

The middle column is the known temperature in °C or °F. The equivalent temperature on the other scale is to right or left of this figure depending on the conversion desired. For example: 100°C is 212°F and 100°F is 37·8°C.

—70 to —1			0 to 34			35 to 69		
C		F	C		F	C		F
—112	**—170**	—274	—17·8	**0**	32	1·7	**35**	95·0
—107	**—160**	—256	—17·2	**1**	33·8	2·2	**36**	96·8
—101·2	**—150**	—238	—16·7	**2**	35·6	2·8	**37**	98·6
—96	**—140**	—220	—16·1	**3**	37·4	3·3	**38**	100·4
—90	**—130**	—202	—15·6	**4**	39·2	3·9	**39**	102·2
—84	**—120**	—184	—15·0	**5**	41·0	4·4	**40**	104·0
—79	**—110**	—166	—14·4	**6**	42·8	5·0	**41**	105·8
—73·4	**—100**	—148	—13·9	**7**	44·6	5·6	**42**	107·6
—68	**—90**	—130	—13·3	**8**	46·4	6·1	**43**	109·4
—62	**—80**	—112	—12·8	**9**	48·2	6·7	**44**	111·2
—57	**—70**	—94	—12·2	**10**	50·0	7·2	**45**	113·0
—51	**—60**	—76	—11·7	**11**	51·8	7·8	**46**	114·8
—45·6	**—50**	—58	—11·1	**12**	53·6	8·3	**47**	116·6
—40·0	**—40**	—40	—10·6	**13**	55·4	8·9	**48**	118·4
—34·4	**—30**	—22	—10·0	**14**	57·2	9·4	**49**	120·2
—28·9	**—20**	—4	—9·4	**15**	59·0	10·0	**50**	122·0
—28·3	**—19**	—2·2	—8·9	**16**	60·8	10·6	**51**	123·8
—27·8	**—18**	—0·4	—8·3	**17**	62·6	11·1	**52**	125·6
—27·2	**—17**	1·4	—7·8	**18**	64·4	11·7	**53**	127·4
—26·7	**—16**	3·2	—7·2	**19**	66·2	12·2	**54**	129·2
—26·1	**—15**	5·0	—6·7	**20**	68·0	12·8	**55**	131·0
—25·6	**—14**	6·8	—6·1	**21**	69·8	13·3	**56**	132·8
—25·0	**—13**	8·6	—5·6	**22**	71·6	13·9	**57**	134·6
—24·4	**—12**	10·4	—5·0	**23**	73·4	14·4	**58**	136·4
—23·9	**—11**	12·2	—4·4	**24**	75·2	15·0	**59**	138·2
—23·3	**—10**	14·0	—3·9	**25**	77·0	15·6	**60**	140·0
—22·8	**—9**	15·8	—3·3	**26**	78·8	16·1	**61**	141·8
—22·2	**—8**	17·6	—2·8	**27**	80·6	16·7	**62**	143·6
—21·7	**—7**	19·4	—2·2	**28**	82·4	17·2	**63**	145·4
—21·1	**—6**	21·2	—1·7	**29**	84·2	17·8	**64**	147·2
—20·6	**—5**	23·0	—1·1	**30**	86·0	18·3	**65**	149·0
—20·0	**—4**	24·8	—0·6	**31**	87·8	18·9	**66**	150·8
—19·4	**—3**	26·6	0	**32**	89·6	19·4	**67**	152·6
—18·9	**—2**	28·4	0·6	**33**	91·4	20·0	**68**	154·4
—18·3	**—1**	30·2	1·1	**34**	93·2	20·6	**69**	156·2

70 to 89			90 to 1000			1100 to 3000		
C		F	C		F	C		F
21·1	**70**	158	32·2	**90**	194	593	**1100**	2012
21·7	**71**	159·8	32·8	**91**	195·8	649	**1200**	2192
22·2	**72**	161·6	33·3	**92**	197·6	704	**1300**	2372
22·8	**73**	163·4	33·9	**93**	199·4	760	**1400**	2552
23·3	**74**	165·2	34·4	**94**	201·2	816	**1500**	2732
23·9	**75**	167·0	35·0	**95**	203·0	871	**1600**	2912
24·4	**76**	168·8	35·6	**96**	204·8	927	**1700**	3092
25·0	**77**	170·6	36·1	**97**	206·6	982	**1800**	3272
25·6	**78**	172·4	36·7	**98**	208·4	1038	**1900**	3452
26·1	**79**	174·2	37·2	**99**	210·2	1093	**2000**	3632
26·7	**80**	176·0	37·8	**100**	212	1149	**2100**	3812
27·2	**81**	177·8	93·3	**200**	392	1204	**2200**	3992
27·8	**82**	179·6	149	**300**	572	1260	**2300**	4172
28·3	**83**	181·4	204	**400**	752	1316	**2400**	4352
28·9	**84**	183·2	260	**500**	932	1371	**2500**	4532
29·4	**85**	185	316	**600**	1112	1427	**2600**	4712
30·0	**86**	186·8	371	**700**	1292	1482	**2700**	4892
30·6	**87**	188·6	427	**800**	1472	1538	**2800**	5072
31·1	**88**	190·4	482	**900**	1652	1593	**2900**	5252
31·7	**89**	192·2	538	**1000**	1832	1649	**3000**	5432

INTERPOLATION FACTORS

C		F	C		F	C		F
0·56	**1**	1·8	4·44	**8**	14·4	33·3	**60**	108
1·11	**2**	3·6	5·00	**9**	16·2	38·9	**70**	126
1·67	**3**	5·4	5·56	**10**	18·0	44·4	**80**	144
2·22	**4**	7·2	11·1	**20**	36·0	50·0	**90**	162
2·78	**5**	9·0	16·7	**30**	54·0	55·6	**100**	180
3·33	**6**	10·8	22·2	**40**	72·0			
3·89	**7**	12·6	27·8	**50**	90·0			

GENERAL PURPOSE THERMOMETERS

Typical general purpose thermometer

TJ-050

THERMOMETERS, Centigrade scales, engraved stem mercury-in-glass, gas filled. Overall length about 300 mm, stem diameter 5–7 mm. 75 mm immersion.

Scale span °C	Subdiv. degC	Ten	Each	
		£	£	
0 to 60	1·0	7·20	0·80	cx
−10 to 110	1·0	6·60	0·74	cx
0 to 200	1·0	7·60	0·84	cx
0 to 250	1·0	8·40	0·94	cx
0 to 360	2·0	8·80	0·98	cx
0 to 400	2·0	9·40	1·04	cx

TJ-052

THERMOMETERS, as TJ-050 but **Fahrenheit scales.**

Scale span °F	Subdiv. degF	Ten	Each	
		£	£	
0 to 110	1·0	7·20	0·80	cx
0 to 240	1·0	7·00	0·78	cx
0 to 400	2·0	7·60	0·84	cx
0 to 600	5·0	8·80	0·98	cx

TJ-058

THERMOMETER, short stem. Similar to TJ-050 but 150 mm long, scale span 0–250°C in 2degC. Specially suitable for semi-micro use with (AG) small scale preparative set DT-765 ... ... Ten **£8·20** Each **£0·90** cx

TJ-060

THERMOMETERS, Centigrade scales, engraved stem mercury-in-glass, gas filled, with safety chamber. Overall length about 400 mm, diameter 5–7 mm. The graduations commence about 10 cm above the mercury bulb.

Scale span °C	Subdiv. degC	Ten	Each	
		£	£	
0 to 105	0·5	13·20	1·50	cx
0 to 150	1·0	12·20	1·35	cx
0 to 250	1·0	12·60	1·40	cx
0 to 360	2·0	13·40	1·50	cx

THERMOMETERS WHICH INDICATE WRONG TEMPERATURES

Wrong indication of temperature is nearly always due to a break in the mercury thread and in most cases the thread can easily be rejoined by the user. Thermometers should be examined before use and if necessary corrected using the procedures detailed on page 664.

TJ-070

THERMOMETERS, Centigrade scales. Mercury-in-glass thermometers, engraved stem, gas filled, with expansion chamber, calibrated for total immersion.

No.	Scale span °C	Subdiv. degC	Length mm	Ten	Each	
				£	£	
1	−5 to 50	0·2	350	12·40	1·40	cx
2	−5 to 50	0·1	400	14·60	1·60	cx
3	−5 to 105	0·2	350	17·00	1·90	cx
4	−5 to 105	0·1	450	22·50	2·50	cx

ADJUSTABLE IMMERSION THERMOMETERS. Suitable for standard joint assemblies and many other purposes see TJ-320 in List No. sequence.

GENERAL PURPOSE THERMOMETERS TO BS 1704

Engraved stem, mercury-in-glass thermometers.
The first thermometer of each total immersion series is spirit filled.

TJ-100

THERMOMETERS, to BS 1704, Centigrade scales, for total immersion. Stem diameter 6 mm.

Schedule mark	Scale span °C	Sub-div. degC	L'gth mm	Ten	Each	
				£	£	
B.GP.35C/TOT	−120 to +35	1·0	350	17·50	1·95	cx
GP.50C/TOT	−35 to +50	0·5	300	15·00	1·65	cx
GP.105C/1·0/TOT	−5 to +105	1·0	300	9·80	1·08	cx
GP.105C/0·5/TOT	−5 to +105	0·5	300	11·20	1·25	cx
GP.150C/TOT	−5 to +150	1·0	300	11·20	1·25	cx
GP.250C/TOT	−5 to +250	1·0	300	12·40	1·40	cx
GP.360C/TOT	−5 to +360	1·0	350	13·60	1·50	cx
GP.400C/TOT	−10 to +400	2·0	300	16·00	1·80	cx
GP.510C/TOT	−10 to +510	2·0	380	26·50	2·95	cx

TJ-104

THERMOMETERS, to BS 1704 Fahrenheit scales, for total immersion. Stem diameter 6 mm.

Schedule mark	Scale span °F	Sub-div. degF	L'gth mm	Ten	Each	
				£	£	
B.GP.96F/TOT	−180 to +96	2·0	350	20·50	2·30	cx
GP.120F/TOT	−35 to +120	1·0	300	15·00	1·65	cx
GP.220F/TOT	30 to 220	1·0	300	11·20	1·25	cx
GP.300F/TOT	30 to 300	1·0	300	11·20	1·25	cx
GP.500F/TOT	28 to 500	2·0	300	12·40	1·40	cx
GP.650F/TOT	26 to 650	2·0	350	13·60	1·50	cx
GP.750F/TOT	20 to 750	5·0	300	15·50	1·75	cx
GP.950F/TOT	20 to 950	5·0	380	40·00	4·40	cx

TJ-102

THERMOMETERS, to BS 1704, Centigrade scales, for partial (100 mm) immersion. Stem diameter 6 mm.

Schedule mark	Scale span °C	Sub-div. degC	L'gth mm	Ten	Each	
				£	£	
GP.50C/100	−35 to +50	0·5	350	14·60	1·60	cx
GP.105C/1·0/100	−5 to +105	1·0	300	9·80	1·08	cx
GP.105C/0·5/100	−5 to +105	0·5	300	11·20	1·25	cx
GP.150C/100	−5 to +150	1·0	300	11·20	1·25	cx
GP.250C/100	−5 to +250	1·0	300	12·40	1·40	cx
GP.360C/100	−5 to +360	1·0	350	13·60	1·50	cx
GP.400C/100	−10 to +400	2·0	300	15·50	1·75	cx
GP.510C/100	−10 to +510	2·0	380	26·50	2·95	cx

TJ-106

THERMOMETERS, to BS 1704, Fahrenheit scales, for partial (100 mm) immersion. Stem diameter 6 mm.

Schedule mark	Scale span °F	Sub-div. degF	L'gth mm	Ten	Each	
				£	£	
GP.120F/100	−35 to +120	1·0	300	15·00	1·65	cx
GP.220F/100	30 to 220	1·0	300	11·20	1·25	cx
GP.300F/100	30 to 300	1·0	300	11·20	1·25	cx
GP.500F/100	28 to 500	2·0	300	12·40	1·40	cx
GP.650F/100	26 to 650	2·0	350	13·60	1·50	cx
GP.750F/100	20 to 750	5·0	300	15·50	1·75	cx
GP.950F/100	20 to 950	5·0	380	26·50	2·95	cx

STANDARD THERMOMETERS TO BS 593

Engraved stem mercury-in-glass thermometers.

TJ-150

THERMOMETERS, to BS 593, Series A, Centigrade scales, for **total immersion.** With zero check scale −0·5 to +0·5degC where applicable. Overall length about 400 mm, stem diameter 5·5 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
A.20C/TOT	−20·5 to +20·5	0·1	£ 20·50	£ 2·30	cx
A.40C/TOT	− 0·5 to +40·5	0·1	21·00	2·35	cx
A.70C/TOT	39·5 to 70·5	0·1	35·00	3·90	cx
A.100C/TOT	69·5 to 100·5	0·1	40·00	4·40	cx
A.130C/TOT	99·5 to 130·5	0·1	43·00	4·80	cx
A.160C/TOT	129·5 to 160·5	0·1	45·00	5·00	cx

TJ-154

THERMOMETERS, to BS 593, Series A, Centigrade scales, for **partial (100 mm) immersion.** With zero check scale −0·5 to +0·5degC where applicable. Overall length about 400 mm, stem diameter 5·5 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
A.10C/100	−30·5 to +10·5	0·1	£ 22·50	£ 2·50	cx
A.20C/100	−20·5 to +20·5	0·1	21·50	2·40	cx
A.40C/100	− 0·5 to +40·5	0·1	19·50	2·15	cx
A.70C/100	39·5 to 70·5	0·1	35·00	3·90	cx
A.100C/100	69·5 to 100·5	0·1	40·00	4·40	cx
A.130C/100	99·5 to 130·5	0·1	43·00	4·80	cx
A.160C/100	129·5 to 160·5	0·1	45·00	5·00	cx

TJ-170

THERMOMETERS, to BS 593, Series B, Centigrade scales, for **total immersion.** With zero check scale −1 to +1degC. Overall length about 400 mm, stem diameter 5·5 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
B.60C/TOT	−20 to +60	0·2	£ 17·50	£ 1·95	cx
B.110C/TOT	50 to 110	0·2	37·00	4·10	cx
B.160C/TOT	99 to 160	0·2	39·00	4·30	cx
B.210C/TOT	150 to 210	0·2	40·00	4·40	cx
B.260C/TOT	200 to 260	0·2	43·00	4·80	cx

TJ-174

THERMOMETERS, to BS 593, Series B, Centigrade scales, for **partial (100 mm) immersion.** With zero check scale −1 to +1degC. Overall length about 400 mm, stem diameter 5·5 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
B.60C/100	−20 to +60	0·2	£ 17·50	£ 1·95	cx
B.110C/100	50 to 110	0·2	37·00	4·10	cx
B.160C/100	99 to 160	0·2	39·00	4·30	cx
B.210C/100	150 to 210	0·2	40·00	4·40	cx
B.260C/100	200 to 260	0·2	43·00	4·80	cx

TJ-200

THERMOMETERS, to BS 593, Series C, Centigrade scales, for **total immersion.** Overall length about 200 mm, stem diameter 5·0 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
C.105C/TOT	−5 to +105	1·0	£ 17·50	£ 1·95	cx
C.205C/TOT	95 to 205	1·0	21·00	2·35	cx
C.305C/TOT	195 to 305	1·0	24·00	2·65	cx
C.400C/TOT	295 to 400	1·0	35·00	3·90	cx

TJ-208

THERMOMETERS, to BS 593, Series C, Centigrade scales, for **partial (100 mm) immersion.** Overall length about 250 mm, stem diameter 5·0 to 7·0 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
C.105C/100	−5 to +105	1·0	£ 18·00	£ 2·00	cx
C.205C/100	95 to 205	1·0	22·50	2·50	cx
C.305C/100	195 to 305	1·0	24·00	2·65	cx
C.400C/100	295 to 400	1·0	35·00	3·90	cx

TJ-230

THERMOMETERS, to BS 593, Series F, Centigrade scales, for **partial (100 mm) immersion.** Overall length about 385 mm, stem diameter 6·0 to 7·5 mm.

Schedule mark	ASTM No.	Scale span °C	Subdiv. degC	Ten	Each	
F.50C/100	37C	−2 to +52	0·2	£ 23·00	£ 2·55	cx
F.75C/100	38C	24 to 78	0·2	25·50	2·85	cx
F.100C/100	39C	48 to 102	0·2	28·00	3·10	cx
F.125C/100	40C	72 to 126	0·2	28·50	3·20	cx
F.150C/100	41C	98 to 152	0·2	28·50	3·20	cx
F.255C/100	42C	95 to 255	0·5	28·50	3·20	cx

SHORT-RANGE, SHORT-STEM THERMOMETERS to BS 1365

Mercury-in-glass thermometers intended to meet the requirements for thermometers of the Anschutz and similar types. In series covering the ranges of −10 to +360°C with scale span of about 60°C. Overall length about 220 to 240 mm.

TJ-264

THERMOMETERS, to BS 1365, Series A2, Centigrade scales, for partial (80 mm) immersion. Stem diameter 5 to 6 mm.

Schedule mark	Scale span °C	Subdiv. degC	Ten	Each	
			£	£	
SA. 55C/80	−10 to +55	0·2	**18·50**	**2·05**	cx
SA.105C/80	45 to 105	0·2	**19·00**	**2·10**	cx
SA.155C/80	95 to 155	0·2	**20·00**	**2·20**	cx
SA.205C/80	145 to 205	0·2	**21·50**	**2·40**	cx
SA.255C/80	195 to 255	0·2	**23·00**	**2·55**	cx
SA.305C/80	245 to 305	0·2	**26·00**	**2·90**	cx
SA.360C/80	295 to 360	0·2	**30·00**	**3·30**	cx

THERMOMETERS WHICH INDICATE WRONG TEMPERATURES

Wrong indication of temperature is nearly always due to a break in the mercury thread and in most cases the thread can easily be rejoined by the user. Thermometers should be examined before use and if necessary corrected using the procedures detailed on page 664.

ADJUSTABLE IMMERSION THERMOMETERS

***TJ-320**

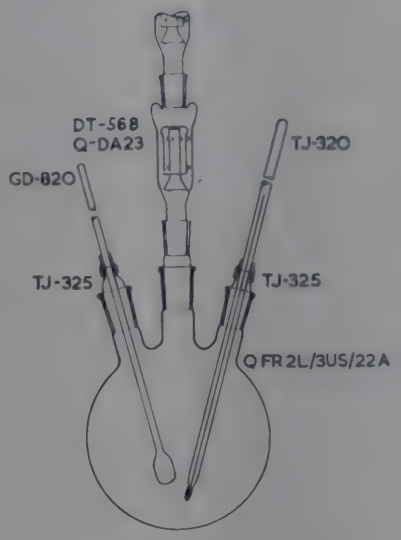
THERMOMETERS, engraved stem, adjustable immersion depth, Centigrade scales, for use in thermometer adapter TJ-325. These thermometers are calibrated for an average immersion of 120 mm and may be used at between 75 and 180 mm immersion depth. Small tolerance on diameter gives a clearance of less than 0·5 mm in the sleeve. Overall length 400 mm, with lowest graduation 220 mm from bulb, subdivided in 1degC. They are particularly useful for use with standard joint apparatus where the adapter can be placed in a stillhead or flask side neck.

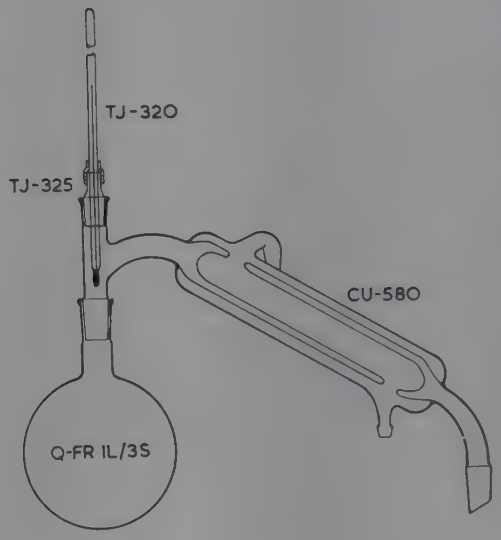
Scale span °C	Subdiv. degC	Ten	Each	
		£	£	
−5 to +105	1	**11·60**	**1·30**	cx
95 to 205	1	**15·00**	**1·70**	cx
195 to 305	1	**18·00**	**2·00**	cx

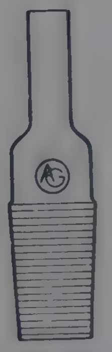
Ⓐ THERMOMETER ADAPTERS

Regd

Assemblies illustrating the versatile use of thermometers TJ-320 with adapters TJ-325.







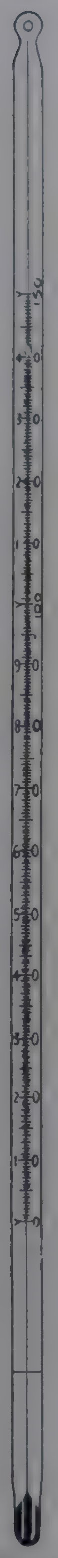
TJ-325

TJ-325

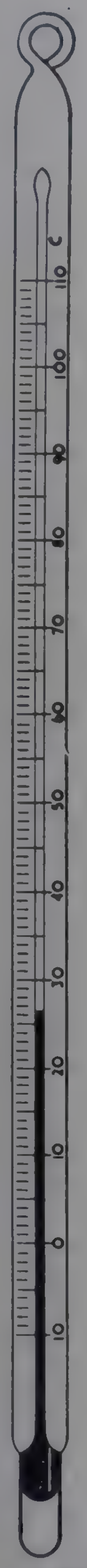
THERMOMETER ADAPTERS, Ⓐ, for fitting thermometers (or gas entry tubes) into standard joint tubulures, allowing adjustment of immersion depth. Comprising standard joint cone fitted with a short length of tubing to take adjustable immersion thermometer TJ-320 or gas distribution tube GD-800. Will also accept other thermometers or tubes not exceeding 6·5 mm dia. The thermometer is held at the desired depth of immersion by means of a short length of rubber or plastics tubing.

Cone	14/23	19/26	
Ten	**£6·00**	**6·40**	ax
Each	**£0·66**	**0·70**	

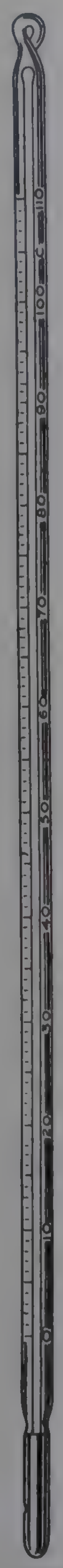
Hortvet cryoscope thermometers see DC-806, DC-808.
Incubator and oven thermometers see HJ-108, IH-110, MV-616, MV-618 in List No. sequence.



TJ-340



TJ-400
TJ-404



TJ-440

MELTING POINT THERMOMETERS

TJ-340

THERMOMETERS, for melting point determinations, Centigrade scales, engraved stem mercury-in-glass, gas filled with expansion chamber. Adjusted for 30 mm immersion. Overall length about 250 mm except No. 5 which is 300 mm, stem dia. 6 mm.

No.		1	2	3	4	5	
Scale span	from	0	140	290	140	0 °C	
	to	150	300	400	190	360°C	
Subdiv.		0·5	0·5	0·5	0·5	1degC	
Ten		**£18·50**	**26·00**	**30·00**	**22·00**	**18·50**	cx
Each		**£ 2·10**	**2·90**	**3·30**	**2·45**	**2·10**	

TJ-380

THERMOMETER, water jacket, for use in gas analysers, etc. Scale span 10 to 40°C subdivided in 0·2degC. Overall length 125 mm, stem diameter 5·5 mm.
Ten **£7·80** Each **£0·86** *cx*

TJ-400

THERMOMETERS, stirring, with reinforced bulb, **Centigrade scales.** Overall length 150 mm, calibrated at total immersion.

Scale span °C	Subdiv. degC	Ten	Each	
		£	**£**	
0 to 50	1·0	**7·20**	**0·80**	*cx*
−10 to +110	1·0	**6·80**	**0·76**	*cx*
0 to 150	1·0	**7·80**	**0·86**	*cx*
0 to 250	2·0	**8·60**	**0·96**	*cx*
0 to 360	2·0	**9·60**	**1·06**	*cx*

TJ-404

THERMOMETERS, stirring, with reinforced bulb, as TJ-400 but 300 mm overall length.

Scale span °C	Subdiv. degC	Ten	Each	
		£	**£**	
0 to 50	1·0	**7·80**	**0·86**	*cx*
−10 to +110	1·0	**7·60**	**0·84**	*cx*
0 to 150	1·0	**8·40**	**0·94**	*cx*
0 to 250	1·0	**9·20**	**1·02**	*cx*
0 to 360	2·0	**10·20**	**1·14**	*cx*

THERMOMETERS WHICH INDICATE WRONG TEMPERATURES

Wrong indication of temperature is nearly always due to a break in the mercury thread and in most cases the thread can easily be rejoined by the user. Thermometers should be examined before use and if necessary corrected using the procedures detailed on page 664.

THERMOMETERS, red reflector type, engraved stem, lens front mercury-in-glass, with red glass strip in stem. The mercury forms a mirror in which is seen a bright red image of the strip. These thermometers can be read more easily and the reading can be seen from a greater distance than with the ordinary mercury pattern and at the same time are free from the disadvantages of spirit filled thermometers.

TJ-440

THERMOMETERS, red reflector type, Centigrade scales. Overall length about 300 mm.

Scale span	0 to 110	0 to 200	0 to 360 °C	
Subdiv.	1·0	1·0	2·0 degC	
Ten	**£14·40**	**16·00**	**19·00**	*cx*
Each	**£ 1·60**	**1·80**	**2·10**	

TJ-442

THERMOMETER, red reflector type, Fahrenheit scales. Overall length about 300 mm. Scale span 0 to 240°F subdivided 2degF.
Ten **£15·00** Each **£1·65** *cx*

BECKMANN DIFFERENTIAL THERMOMETERS

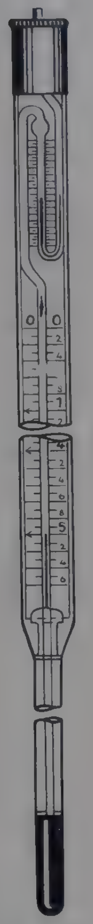
Beckmann differential thermometers are used for the accurate measurement of very small changes in temperature, e.g. for boiling point and freezing point determinations. A fine capillary and large bulb enable the scale to be subdivided into 0·01degC, yet the thermometers can be used over a range of about 100°C or more.

Thermometers with zero at top of the scale are for freezing point determinations, i.e. for measuring with falling temperature; those with zero at bottom of scale are for boiling points, i.e. for measuring with rising temperature.

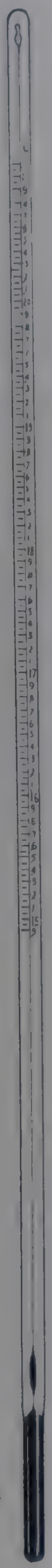
***TJ-521**
THERMOMETER, Beckmann, approximate range —10 to 150°C, scale span 5 or 6degC, subdivided in 0·01degC, **with zero at top of scale.** Overall length about 550 mm, scale length about 230 mm. Immersion 150 mm ... ... Each **£14·50** *cx*

***TJ-523**
THERMOMETER, Beckmann, as TJ-521, approximate range —10 to 150°C, scale span 5 or 6degC, subdivided in 0·01degC, but **with zero at bottom of scale.** Each **£14·50** *cx*

***TJ-525**
THERMOMETER, Beckmann, as TJ-521, approximate range —10 to 150°C, but scale span 1degC, subdivided in 0·002degC, and **with zero at bottom of scale.** Each **£22·00** *cx*



TJ-521



TJ-564 to TJ-577

CALORIMETER THERMOMETERS

6degC RANGE THERMOMETERS TO BS 791

A range of seven engraved stem total immersion thermometers, overall length about 750 mm, with maximum error of 0·1degC at any point and maximum change in error of 0·1degC for any interval of 0·5degC. They are subdivided in 0·01degC.

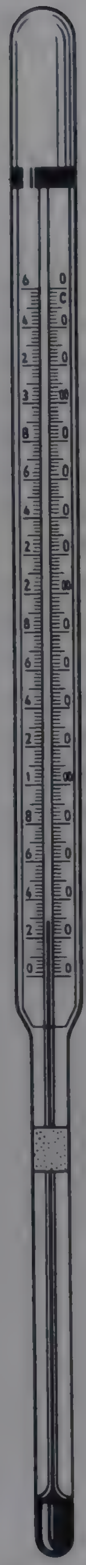
NPL certificates for these thermometers give the value of corrections at 11 points (each 0·5degC) to an accuracy of ±0·002degC.

Without certificate

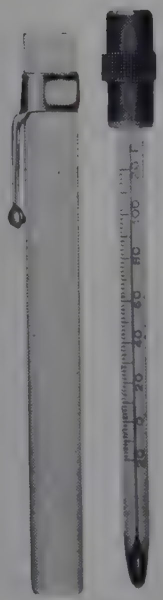
List No.	BS 791 Schedule mark	Scale span °C	Each £	
***TJ-564**	Cal. 15 to 21 C	15 to 21	**17·50**	*cx*
***TJ-566**	Cal. 18 to 24 C	18 to 24	**17·50**	*cx*
***TJ-568**	Cal. 21 to 27 C	21 to 27	**17·50**	*cx*
***TJ-570**	Cal. 24 to 30 C	24 to 30	**17·50**	*cx*
***TJ-572**	Cal. 27 to 33 C	27 to 33	**17·50**	*cx*
***TJ-574**	Cal. 30 to 36 C	30 to 36	**17·50**	*cx*
***TJ-576**	Cal. 33 to 39 C	33 to 39	**17·50**	*cx*

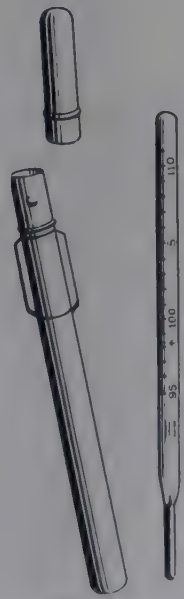
With NPL certificate

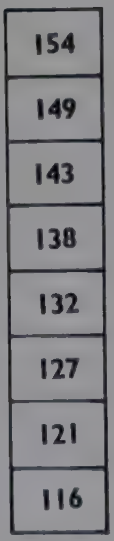
List No.	BS 791 Schedule mark	Scale span °C	Each £	
***TJ-565**	Cal. 15 to 21 C	15 to 21	**45·00**	*mx*
***TJ-567**	Cal. 18 to 24 C	18 to 24	**45·00**	*mx*
***TJ-569**	Cal. 21 to 27 C	21 to 27	**45·00**	*mx*
***TJ-571**	Cal. 24 to 30 C	24 to 30	**45·00**	*mx*
***TJ-573**	Cal. 27 to 33 C	27 to 33	**45·00**	*mx*
***TJ-575**	Cal. 30 to 36 C	30 to 36	**45·00**	*mx*
***TJ-577**	Cal. 33 to 39 C	33 to 39	**45·00**	*mx*


TJ-682

°C
°F
110
100
90
80
70
60
50
40
30
20
10
0
240
220
200
180
160
140
120
100
80
60
40
20
TJ-720


TJ-802


TJ-840



TJ-830

ENCLOSED SCALE THERMOMETERS

THERMOMETERS, enclosed opal glass scale, for total immersion of stem. Length of scale 30 cm, stem diameter 11 mm, scale tube diameter about 19 mm.

List No.	Stem length cm	Scale span °C	Subdiv. degC	Ten	Each	
				£	£	
TJ-680	15	0 to 110	1·0	**32·00**	**3·60**	*cx*
	15	0 to 200	2·0	**35·00**	**3·90**	*cx*
TJ-682	30	0 to 110	1·0	**41·00**	**4·60**	*cx*
	30	0 to 200	2·0	**43·00**	**4·80**	*cx*
	30	0 to 360	2·0	**46·00**	**5·10**	*cx*
TJ-684	60	0 to 200	2·0	**52·00**	**5·80**	*cx*
	60	0 to 360	2·0	**58·00**	**6·40**	*cx*

DIPPING THERMOMETERS

TJ-720

THERMOMETERS, dipping, with stainless steel dual scale and polypropylene case having suspension hook and a reservoir at the bottom for liquid sampling. Overall dimensions 300 × 45 × 40 mm.

Scale	−30 to 50 and −20 to 120	−5 to 115°C and 20 to 240°F	
Ten	**£9·60**	**9·60**	*cx*
Each	**£1·06**	**1·06**	

POCKET THERMOMETERS

TJ-802

THERMOMETER, pocket, with stem fixed into a cap which fits into a case fitted with pocket clip. Overall length approx. 140 mm. Range −10° to 110°C in 2degC.
Ten **£7·60** Each **£0·84** *cx*

TJ-803

THERMOMETER, as TJ-802 but scaled 30° to 220°F in 2degF .... Ten **£7·40** Each **£0·82** *cx*

TEMPERATURE INDICATING STRIPS

TJ-830

TEMPERATURE INDICATING STRIPS, *Thermax*, self adhesive, suitable for indicating and monitoring surface temperature. Can provide a permanent record of temperatures reached. Each strip comprises 8 or more individual indicators printed with a series of temperatures. The indicators turn black when subjected to dry heat at the temperatures printed and the figures remain legible after heating. In packs of 10 strips each covering the same temperature range.

Range	37 to 65	71 to 110	116 to 154	160 to 199	204 to 260°C	
Pack	**£1·50**	**1·50**	**1·50**	**1·50**	**1·50**	*mx*

CLINICAL THERMOMETERS

THERMOMETERS, clinical, to BS 691, engraved stem lens front. Scale span 95 to 110°F in 0·2degF in case.

List No.	Type	Ten	Each	
		£	£	
TJ-840	'Long bulb' with works certificate	**4·90**	**0·54**	*cx*
TJ-841	'Long bulb' BST stamped	**6·00**	**0·66**	*cx*

THERMOMETER READERS

TJ-900

THERMOMETER READER, metal construction, with adjustable focusing eyepiece and spring loaded clip to accommodate thermometers up to 13 mm diameter.

Each **£4·60** *bx*

TJ-905

THERMOMETER READER, with plastics lens held in a rubber moulding and giving ×2 magnification. The magnifier clips on thermometers or burettes up to 13 mm diameter by a stainless steel wire spring. Two pointers formed from the rubber moulding assist the accurate reading of the mercury or liquid meniscus.

Each **£1·76** *fx*

THERMOMETER CASES

TJ-910

THERMOMETER CASES, brass, to take thermometers 5 to 7 mm diameter.

No.	1	2	
For thermometers, overall length	300 to 320	340 to 360 mm	
Ten	**£9·40**	**11·80**	*cx*
Each	**£1·04**	**1·30**	

MAXIMUM AND MINIMUM AND WALL THERMOMETERS

***TJ-920**

THERMOMETERS, maximum, engraved stem, overall length about 300 mm, stem diameter 6 to 7 mm. After use, the mercury is shaken down in the same manner as a clinical thermometer.

Scale span	–10 to 110	0 to 200	0 to 360°C	
Subdivision	1·0	1·0	2·0degC	
Ten	**£20·00**	**22·00**	**32·00**	*cx*
Each	**£2·20**	**2·45**	**3·60**	

TJ-934

THERMOMETER, maximum and minimum, Six's pattern, to BS 2840, for wall mounting. Spirit-in-glass thermometer with mercury indicating thread and two cursors mounted on dual scale graduated 0 to +130°F, subdivided in 2degF and −20 to +55°C subdivided in 1degC in plastics frame. Overall length about 270 mm. Complete with magnet.

Ten **£20·00** Each **£2·20** *cx*

TJ-952

THERMOMETER, wall, solid stem, red spirit-in-glass, mounted on 21×4 cm wood base with scale graduated 20 to 120°F subdivided in 2degF and −5 to +50°C in 1degC. With bulb guard.

Ten **£7·20** Each **£0·80** *cx*

TJ-954

THERMOMETER, wall, to requirements of Factories Act. Solid stem, lens front, red spirit-in-glass on hardwood scale 250 mm graduated 20 to 120°F subdivided in 2degF with extra bold graduation and figure at 60°F and −10 to 50°C in 1degC. With bulb guard.

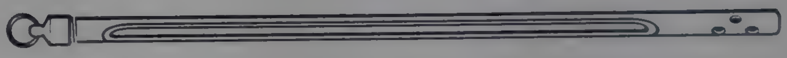
Ten **£7·20** Each **£0·80** *cx*

SH-210

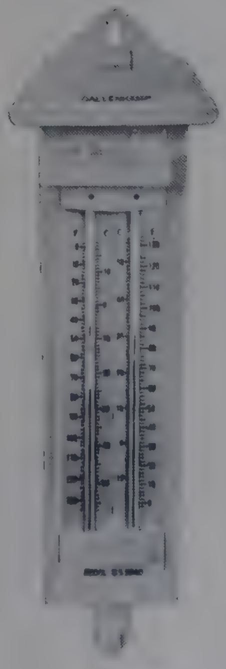
SOIL THERMOMETER. For details and prices see entry in List No. sequence.

TJ-900

TJ-905


TJ-910

TJ-920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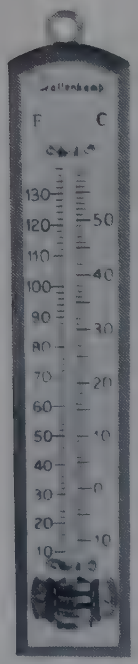
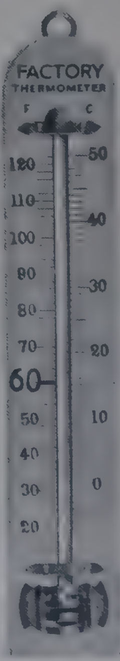


TJ-952



TJ-954

Dial thermometers for bench and wall mounting—see overleaf.

BIMETALLIC DIAL THERMOMETERS

Gallenkamp
F

TJ-960

Gallenkamp

TJ-966

TJ-960

DIAL THERMOMETER, wall, bimetallic, with dial 15 cm dia. scaled —20 to +140°F and —30 to +60°C in black plastics frame Ten **£14·60** Each **£1·60** *cx*

TJ-966

DIAL THERMOMETER, bench, bimetallic with 10 cm diameter dial scaled —20 to +140°F and —30 to +60°C, mounted in a black plastics frame for bench mounting.
Each **£1·20** *cx*

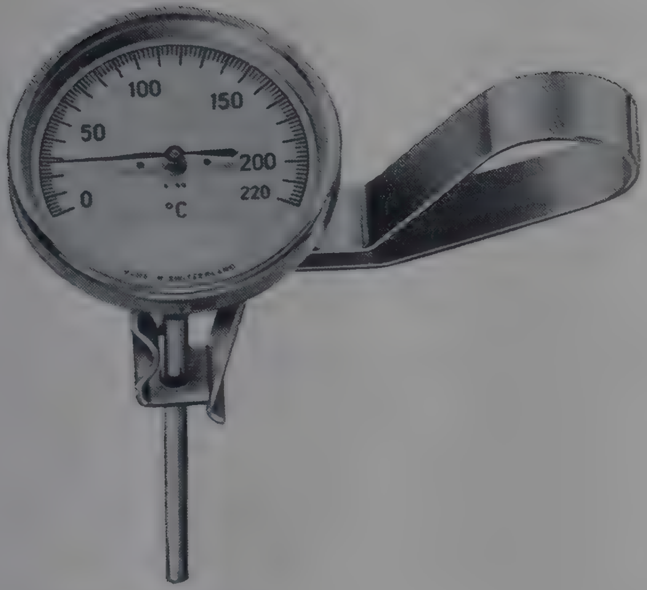
***TJ-970**

DIAL THERMOMETERS, with dial 46 mm dia. and stainless steel stem 200 mm long, 4 mm diameter. Minimum immersion depth 60 mm. Accuracy approximately 1% of full scale.

Scale span	—10 to 110	0 to 220	0 to 400°C	
Subdivision	1	2	5degC	
Each	**£6·10**	**6·30**	**6·30**	*cx*

ACCESSORY

***TJ-972** **Holding clip,** for TJ-970, nickel-plated brass, providing handle and mounting clip. Can be used as a clip to hold thermometer in water bath having wall thickness up to 6 mm ... ... Each **£1·20** *cx*



TJ-970 with TJ-972

TJ-980

***TJ-980**

DIAL THERMOMETER, pocket pattern with dial 24 mm dia. and stainless steel stem 120 mm long, 4 mm diameter, complete with pocket clip and protective sheath which must be removed before immersing stem of thermometer in liquid. Scale span 0 to 100°C.
Each **£4·30** *cx*

***TJ-990**

DIAL THERMOMETER, surface pattern for measuring temperature of flat surfaces such as hotplates. Dial 46 mm dia. Stem 39 mm long with copper end 25 mm dia. Scale span 0 to 400°C ... ... Each **£6·80** *cx*

TEMPERATURE INDICATING STRIPS for indicating surface temperatures—see TJ-830 in List No. sequence.

0
50
100
150
200
250
300
350
400
°C

TJ-990

THERMOMETER CALIBRATION EQUIPMENT

Oil Baths see OD-050 et seq.

Thermostat Baths, heated, see VS-615 et seq.

Thermostat Baths, cooled, see WF-720 et seq.

Full details of above will be found in List No. sequence.

ELECTRICAL THERMOMETERS

DIGITAL READING THERMOMETER

The platinum resistance temperature sensing element acts as part of a self-compensating resistance measuring bridge. The output signal of the bridge is fed via a transistorised amplifier to a stepping motor which maintains the bridge in balance and operates the digital counter.

Technical Data

Temperature range	−20 to +300°C
Accuracy	From ±0·15 to ±0·5degC depending on temperature range
Reproducibility	±0·05degC
Reading resolution	0·1degC (1 digital step)
Response time	approx. 100°C/20 seconds
Recorder connection	1 mV/degC; linearity +0·15%
—output voltage	max. 320 mV
—internal resistance	max. 500Ω
Admissible ambient temperature	−20 to +50°C
Power connection	110 to 250V 50 or 60 Hz single phase supplies
Overall dimensions	115×170×215 mm

***TK-010**

THERMOMETER, digital reading, *Mettler* TM15, as specification. With output for recorder but **without temperature probe.** For 110/250V 50/60 Hz single phase supplies ... ... Each **£253·00** *kx*

Mettler TM 15

TK-010

ACCESSORY PROBES

***TK-015** **Temperature probe,** 150×5 mm, glass, with 2 metres of cable ... ... Each **£74·00** *kx*

***TK-017** **Temperature probe,** 150×5 mm, glass, with 4 metres of cable ... ... Each **£74·00** *kx*

***TK-018** **Temperature probe,** 100×7 mm, glass, with 2 metres of cable ... ... Each **£54·00** *kx*

***TK-019** **Temperature probe,** 150×2·5 mm, stainless steel, with 2 metres of cable ... ... Each **£74·00** *kx*

***TK-021** **Temperature probe,** 150×2·5 mm, stainless steel, with 4 metres of cable ... ... Each **£74·00** *kx*

***TK-022** **Temperature probe,** 100×6 mm, stainless steel, with 2 metres of cable ... ... Each **£54·00** *kx*

***TK-023** **Temperature probe,** 250×6 mm, stainless steel, with 2 metres of cable ... ... Each **£54·00** *kx*

***TK-024** **Temperature probe,** 50×11 mm, for surface temperature measurement ... ... Each **£64·50** *kx*

TK-025** **Switch,** multiple socket, to accept up to six temperature probes ... ... Each **£48·40kxN*

POINTER READING THERMOMETERS

TK-070

THERMOMETER, electrical, battery operated with 9·5 cm scale −50°C to 50°C subdivided every 5degC from −50 to 0°C and every 2degC from 0 to +50°C. With simple operating controls including calibration check and OFF positions. Sockets are provided for connecting **up to six temperature probes,** selection of which is by push buttons on the front panel. In metal case complete with battery. Overall dimensions 21×16×7·5 cm high. **Requires but does not include one or more probes** ... ... Each **£37·00** *mx*

TK-075

THERMOMETER, electrical, as TK-070 but range 10°C to 150°C subdivided every 5degC. In metal case complete with battery. **Requires but does not include one or more probes** ... ... Each **£37·00** *mx*

REPLACEMENT PART

TK-078 **Battery,** Mallory TR134R ... ... Each **£1·50** *fx*

TK-075

ACCESSORIES

TK-080 **Temperature probe,** 65×4 mm, stainless steel, mounted in handle 80 mm long and fitted with 2 metres of cable ... ... Each **£9·30** *mx*

TK-084 **Temperature probe,** 15×6 mm, aluminium, with removable copper clip for surface temperature measurements, 2 metres of cable... ... ... Each **£6·25** *mx*

TK-086 **Temperature probe,** 440×10 mm, stainless steel, with rounded tip and T-pattern thermoplastics handle and 2 metres of cable. Suitable for use in soil and other loose material ... ... Each **£14·00** *mx*

TK-088 **Carrying case** ... ... Each **£3·80** *mx*

0 20 40 60 80 100
°C
Rustrak

TK-115
(TK-120 is similar)

TEMPERATURE RECORDERS

TK-115

TEMPERATURE RECORDER, *Rustrak,* **miniature, range −10° to 110°C for recording incubator temperatures.** A compact instrument incorporating automatic cold junction compensation and a galvanometer movement, the deflection of which is recorded at frequent intervals by means of the pointer being pressed on to 60 mm wide pressure sensitive paper. The chart drive mechanism is mounted on the front swing down panel for easy removal and replacement of the chart roll. The chart speed of 1·25 cm/hr gives the roll approximately two months' continuous running life. Temperature can be read off directly to an accuracy of ±5degC and changes of temperature to within 1degC.

Supplied with one roll of chart paper and a stainless steel sheathed iron: constantan thermocouple probe 300 mm long × 5 mm diameter with two metres lead.

For 220/260V 50 Hz single phase supplies Each **£99·00** *fx*
For 105/125V 60 Hz single phase supplies Each **£99·00** *fxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART
TK-117 **Chart roll,** scaled —10 to 110°C ... Each £1·20 *fx*

TK-120

TEMPERATURE RECORDER, *Rustrak,* **miniature, range 50° to 300°C, for recording oven temperatures.** A compact instrument incorporating automatic cold junction compensation and a galvanometer movement, the deflection of which is recorded at frequent intervals by means of the pointer being pressed on to 60 mm wide pressure sensitive paper. The chart speed of 1·25 cm/hr gives the roll approximately two months' continuous running life.

Temperature can be read off directly to an accuracy of ±5degC. Supplied complete with one roll of chart paper and a stainless steel sheathed chromel:alumel thermocouple probe, 300 mm long × 5 mm diameter, with two metres lead.

For 220/260V 50 Hz single phase supplies Each **£99·00** *fx*
For 105/125V 60 Hz single phase supplies Each **£99·00** *fxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART
TK-122 **Chart roll,** scaled 50 to 300°C ... ... Each £1·20 *fx*

THERMOGRAPHS

STANDARD CHART RANGES °C

−10 to +40
0 to 50
10 to 60
20 to 70
30 to 80
50 to 100

TK-130

THERMOGRAPH, 24 hour recording, clockwork drive, conforming to BS 3231. For recording air temperature in the vicinity of the instrument. The temperature is measured by a bimetallic strip and recorded as an ink trace on a scaled chart. Accuracy is ±1% of full scale. A screw adjustment is provided to raise or lower the temperature range subject to a total span of 50°C being maintained. With 100 charts of a **range to be selected by the user,** bottle of ink and instructions for use. Case white stove enamel finished. ... ... Each **£45·00** *fxN*

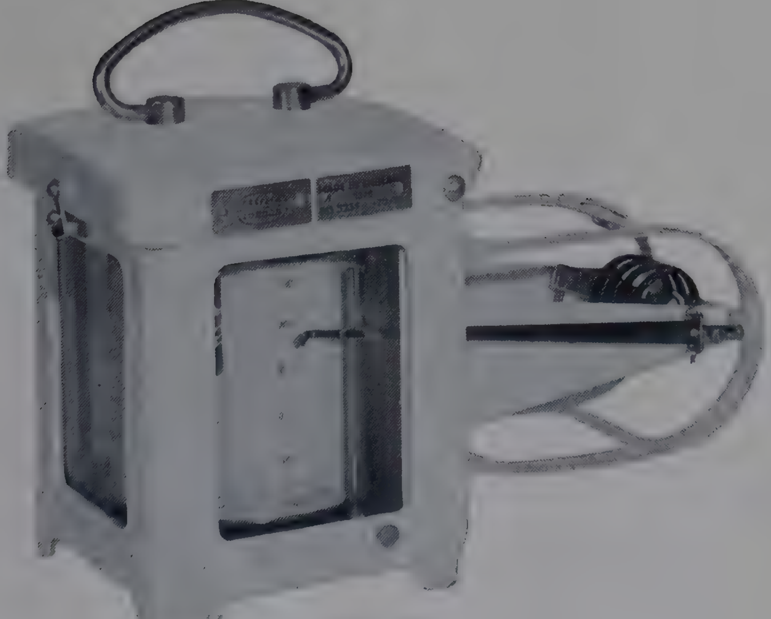
TK-135

THERMOGRAPH, as TK-100 but for **7 day recording.** With 100 charts of a **range to be selected by the user,** bottle of ink and instructions for use. Case white stove enamel finished ... ... Each **£45·00** *fxN*

REPLACEMENT PARTS
TK-137 **Charts,** 24 hour recording, range as selected. Box of 100 £1·25 *fxN*
TK-138 **Charts,** 7 day recording, range as selected. Box of 100 £1·25 *fxN*

When ordering charts please specify range, selected from the ranges given above.

ACCESSORIES. See TK-164 to TK-178 on page opposite.



TK-130
TK-135

THERMOHYGROGRAPHS

TK-150

THERMOHYGROGRAPH, for 24 hour recording, with clockwork drive. Temperature and relative humidity, measured by a bimetallic strip and prepared hair respectively, are recorded as ink traces on a scaled chart. The temperature accuracy is ±1% of full scale and the humidity accuracy is ±3% between 20 and 80% r.h. With 100 charts, two bottles of differently coloured ink and instructions for use. Case white stove enamel finished.

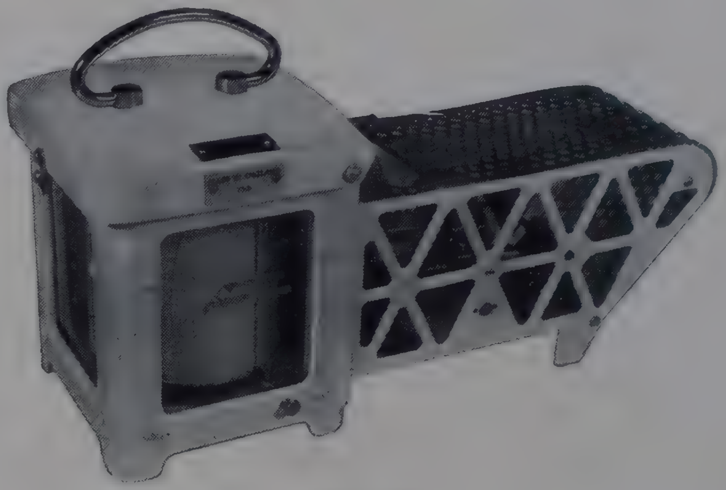
Range −10 to +40°C, 0 to 100% r.h. ...	Each	**£48·00**	*fxN*
Range 0 to +50°C, 0 to 100% r.h.	Each	**£48·00**	*fxN*
Range 10 to +60°C, 0 to 100% r.h. ...	Each	**£48·00**	*fxN*

TK-155

THERMOHYGROGRAPH, as TK-150 but **for 7 day recording.** With 100 charts, two bottles of different coloured ink and instructions for use. Case white stove enamel finished.

Range −10 to +40°C, 0 to 100% r.h. ...	Each	**£48·00**	*fx*
Range 0 to +50°C, 0 to 100% r.h. ...	Each	**£48·00**	*fx*
Range 10 to +60°C, 0 to 100% r.h. ...	Each	**£48·00**	*fx*

NOTE: When ordering Thermohygrographs please state the temperature range selected from those listed. Each instrument can be used only with the temperature chart selected at the time of purchase.



TK-150
TK-155

REPLACEMENT PARTS

TK-160	**Charts,** 24 hour recording, range as selected.	Box of 100	**£1·25**	*fxN*
TK-162	**Charts,** 7 day recording, range as selected.	Box of 100	**£1·25**	*fx*

When ordering charts please specify range, selected from the ranges given above.

ACCESSORIES FOR THERMOGRAPHS AND THERMOHYGROGRAPHS

TK-164	**Ink,** violet	Bottle	**£0·20**	*fx*
TK-166	**Ink,** green	Bottle	**£0·20**	*fx*
TK-170	**Pen, short,** for temperature trace ...	Each	**£0·25**	*fx*
TK-172	**Pen, long,** for humidity trace	Each	**£0·25**	*fx*
TK-176	**Change wheels,** to convert 24 hour to 7 day recording.	Set	**£1·00**	*fx*
TK-178	**Change wheels,** to convert 7 day to 24 hour recording.	Set	**£1·00**	*fx*

TK-200

THERMOHYGROGRAPH, *Rustrak,* **ranges 15° to 35°C and 10% to 90% r.h. for recording atmospheres in ovens and rooms.** A compact instrument incorporating a galvanometer movement, the deflection of which is recorded at frequent intervals by means of the pointer being pressed on to the 60 mm wide pressure sensitive paper of a strip chart. The chart drive mechanism is mounted on the front swing down panel for easy removal and replacement of the chart roll.

The Chart speed of 1·25 cm/hr gives the roll approximately two months' continuous running life. Temperature can be read off directly to an accuracy of better than ±1degC and relative humidity to ±4 r.h. humidity between 20% and 80% r.h. Changes of temperature and relative humidity are readable to even smaller values. Supplied with one roll of chart paper and a combined electrohumidity and thermistor probe with two metres lead.

For 220/260V 50 Hz single phase supplies	Each	**£186·00**	*fxN*
For 105/125V 60 Hz single phase supplies	Each	**£186·00**	*fxN*

When ordering please state voltage and frequency of supply.

°C
%RH
Rustrak

TK-200

REPLACEMENT PART

TK-202	**Chart roll**	Each	**£0·80**	*fx*

IP STANDARD THERMOMETERS

Specified in *IP Standards for Petroleum and its Products, Part 1*, published by the Institute of Petroleum

List No.	Designation	Scale span	Each
			£
TK-502	IP 1F	−36°F to +120°F	1·70
TK-503	IP 1C	−38°C to +50°C	1·70
TK-504	IP 2F	−112°F to +70°F	1·55
TK-505	IP 2C	−80°C to +20°C	1·55
TK-506	IP 3F	30°F to 220°F	1·25
TK-507	IP 3C	−1°C to +105°C	1·25
TK-509	IP 4C	−4°C to +360°C	2·10
TK-511	IP 5C	−2°C to +300°C	2·80
TK-513	IP 6C	−2°C to +400°C	2·90
TK-514	IP 8F	30°F to 110°F	1·70
TK-515	IP 8C	0°C to 44°C	1·70
TK-516	IP 9F	100°F to 180°F	1·80
TK-517	IP 9C	37·8°C to 82°C	1·80
TK-518	IP 10F	170°F to 250°F	1·85
TK-519	IP 10C	76°C to 122°C	1·85
TK-521	IP 14C	−80°C to +20°C	1·80
TK-522	IP 15F	20°F to 230°F	2·35
TK-523	IP 15C	−7°C to 110°C	2·35
TK-524	IP 16F	200°F to 700°F	2·70
TK-525	IP 16C	90°C to 370°C	2·70
TK-526	IP 17F	100°F to 180°F	2·80
TK-527	IP 17C	38°C to 82°C	2·90
TK-531	IP 20C	−38°C to +42°C	2·20
TK-533	IP 21C	25°C to 105°C	2·20
TK-536	IP 23F	94°F to 108°F	2·70
TK-537	IP 23C	34°C to 42°C	3·10
TK-540	Abel oil cup	50°F to 150°F	2·00
TK-541		10°C to 65°C	2·00
TK-542	Abel water bath	90°F to 190°F	2·00
TK-543		32°C to 88°C	2·00
TK-544	IP 28F	20°F to 760°F	2·90
TK-545	IP 28C	−6°C to +400°C	3·40

List No.	Designation	Scale span	Each
			£
***TK-546**	IP 29F	66·5°F to 71·5°F	5·30
***TK-547**	IP 29C	18·6°C to 21·4°C	5·40
***TK-550**	IP 31F	97·5°F to 102·5°F	5·30
***TK-551**	IP 31C	36·6°C to 39·4°C	5·60
***TK-552**	IP 32F	208·5°F to 213·5°F	6·50
***TK-553**	IP 32C	98·6°C to 101·4°C	7·40
***TK-554**	IP 33F	29°F to 35°F	4·80
***TK-558**	IP 35F	137°F to 143°F	6·00
***TK-565**	IP 38C	23°C to 27°C	3·00
TK-566	IP 39F	30°F to 100°F	2·30
TK-567	IP 39C	−1°C to +38°C	2·30
TK-569	IP 40C	20°C to 120°C	2·70
TK-571	IP 41C	100°C to 230°C	2·80
TK-583	IP 47C	150°C to 175°C	3·60
TK-609	IP 60C	−2°C to 80°C	2·00
TK-611	IP 61C	30°C to 200°C	2·20
TK-612	IP 62F	20°F to 580°F	3·10
***TK-613**	IP 62C	−5°C to 300°C	3·00
TK-615	IP 63C	32°C to 127°C	2·60
TK-616	IP 64F	−5°F to +215°F	2·20
TK-617	IP 64C	−20°C to +102°C	2·55
TK-636	IP 74F	−35°F to +160°F	2·80
TK-638	IP 75F	−25°F to +180°F	2·90
TK-640	IP 76C	10°C to 55°C	2·75
TK-650	IP 81C	98°C to 152°C	3·20
TK-656	IP 84C	148°C to 202°C	3·90
TK-666	IP 89F	30°F to 350°F	2·70
TK-668	IP 89C	−1°C to 175°C	2·70

All items on this page are coded *cx*.

THERMOREGULATORS and CONTACT THERMOMETERS

Liquid expansion devices for the thermostatic control of baths containing water or other liquids. Contact thermometers may also be used for controlling air oven temperatures.

NOTE: All apparatus listed on this page must be used in conjunction with a sensitive relay. For loads up to 20A a.c. electronic relay EC-980 is recommended.

TM-450

THERMOREGULATOR, liquid expansion type, (AG) borosilicate glass. Capable of controlling to 0·01degC over the range 0 to 100°C. With expansion bulb, sidearm reservoir with stopcock and fine adjustment screw head. The expansion bulb is normally filled with an inert expansion fluid such as toluene and the remainder of the thermometer with mercury to complete the electrical circuit for switching. Overall length including adjustment head 40 cm. Supplied empty but with instructions for filling and operating ... ... Each **£6·00** *bx*

NOTE: Approximate capacity of TM-450 is 100 ml of sulphur free expansion fluid and 30 ml of triple distilled mercury.

REPLACEMENT PART

TM-452 Glass part only ... ... Each **£2·45** *ax*

ACCESSORIES

EC-980	**Electronic relay,** *Gallenkamp.*	For details and prices see entries in List No. sequence.
MF-932	**Mercury,** triple distilled.	

TM-475

CONTACT THERMOMETER, Jackson, mercury filled and sealed, U.K. Patent No. 660,221. A Beckmann differential type thermometer capable of controlling to ±0·01degC over the range 0 to 100°C. Coarse control of temperature operating point is achieved by transferring mercury between the internal reservoir and the bulb. Fine control is by means of an adjusting head which is rotated to control the position of a contact wire in the thermometer capillary. The head incorporates a two-pin plug for electrical connection and a mating socket is provided. Moulded graduations on the head facilitate final adjustment of temperature and the set point responds in either direction to rotation of the head through a fraction of a division. The thermometer has a 50 division reference scale, for any given volume of mercury in the bulb, which represents an operating range of approximately 10°C. Overall length including adjusting head 35 cm. ... ... Each **£8·25** *mx*

ACCESSORY

EC-980 **Electronic relay,** *Gallenkamp.* For details and price see entry in List No. sequence.

TM-480

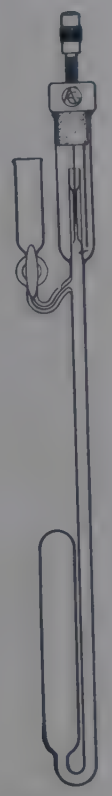
CONTACT THERMOMETERS, direct reading, adjustable, mercury filled and sealed. Capable of controlling to within 0·1degC. With two opal glass scales, the upper one for setting and the lower one reading the temperature. An adjusting head contains a magnetic coupling device to adjust the thermometer setting to the required temperature against the internal scale. Overall length including adjustable head 40 cm; immersion depth 15 cm.

Scale range	0 to 50	100	200	350°C	
Subdivision	1	1	2	5degC	
Each	**£8·50**	**8·50**	**8·50**	**8·50**	*cx*

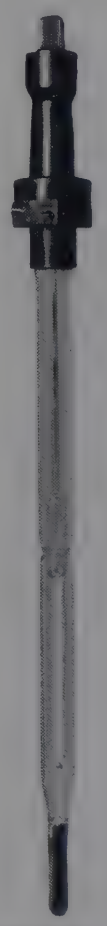
ACCESSORIES

TM-482 **Protective casing,** metal, screwed ⅜ in BSP. Each **£4·70** *cx*

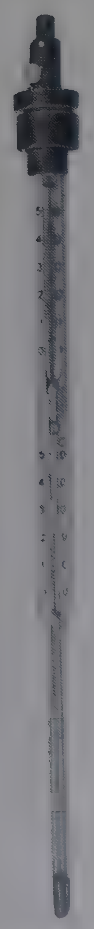
EC-980 **Electronic relay,** *Gallenkamp.* For details and price see entry in List No. sequence.



TM-450



TM-475



TM-480

Gallenkamp Compenstat HYDRAULIC THERMOSTAT

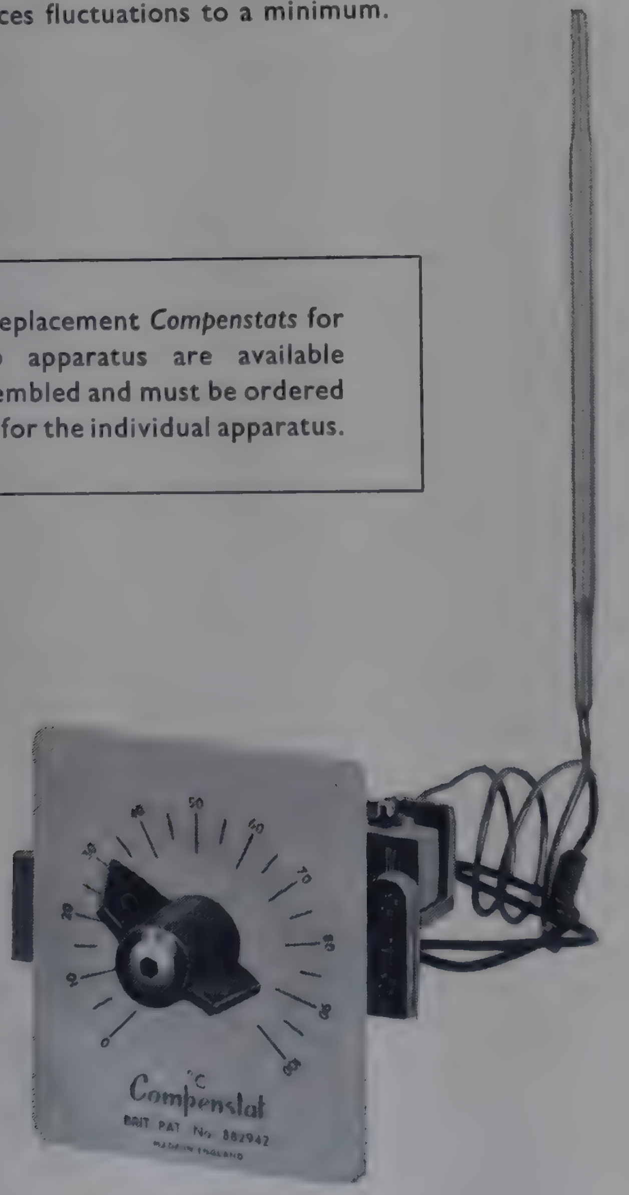
REGD. TRADE MARK REGD. TRADE MARK

(U.K. Patent No. 882,942)

The *Compenstat* hydraulic thermostat is suitable for fitting to a wide range of laboratory equipment. It gives accurate and reliable temperature control when installed in accordance with simple instructions and is readily built into equipment because the sensing bulb is connected by a flexible capillary tube to the control head. The bulb position can therefore be chosen for maximum efficiency, while the head can be independently positioned to suit the overall design of the equipment.

The hydraulic *Compenstat* comprises basically a sensing bulb, a capillary connecting tube and a control head. The system is unaffected by barometric pressure variations. A scale plate calibrated in degC facilitates temperature setting. In operation the bulb is heated until the expansion of the filling liquid extends a bellows which actuates a microswitch and turns off the heaters. Compensation for ambient temperature effects on the control head is provided. Rapid temperature response is obtained by a heat feed-back system which consists of a heater fixed to the capillary tube. The heat feed-back enables the *Compenstat* to anticipate the approach of the desired temperature and thus prevent overshoot. During steady operation it provides a form of proportional control and reduces fluctuations to a minimum.

NOTE: Replacement *Compenstats* for *Gallenkamp* apparatus are available factory assembled and must be ordered specifically for the individual apparatus.



TM-515

- **Prepacked kits—easily installed**
- **Direct temperature scale**
- **Temperature fluctuations down to 0·25degC**
- **Good long term stability**
- **Ambient temperature compensation**

These *Compenstat* kits are for user installation in ovens, incubators, liquid baths, etc, not of *Gallenkamp* manufacture.

Each kit includes a small transformer to ensure the correct current through the capillary heater for a wide variety of main heater loadings.

The microswitch, which has single pole changeover contacts, is rated at 15A a.c. non-inductive. For higher loads and for all d.c. applications a relay must be used (see EC-980).

DIMENSIONS

Bulb	15 cm long, 6·4 mm diameter
Capillary	110 cm long
Head (overall)	3·5 cm high × 9 cm wide × 7 cm deep

TM-510

THERMOSTAT KIT, *Compenstat, Gallenkamp*, as specification, range 0 to 100°C. For use in incubators, ovens etc. For 50/60 Hz single phase supplies.

For 220/240V	Each	**£17·50** *bx*
For 200/210V	Each	**£17·50** *bx*
For 110/120V	Each	**£17·50** *bx*

TM-511

THERMOSTAT KIT, *Compenstat, Gallenkamp*, as TM-510 but range 40 to 250°C. For 50/60 Hz single phase supplies.

For 220/240V	Each	**£17·50** *bx*
For 200/210V	Each	**£17·50** *bx*
For 110/120V	Each	**£17·50** *bx*

TM-515

THERMOSTAT KIT, *Compenstat, Gallenkamp*, as specification, range 0 to 100°C. For use in water or oil baths. With $\frac{5}{16}$ in BSF union on capillary to make a liquid tight seal. Capillary length from head to union 34 cm; from union to bulb 10 cm. For 50/60 Hz single phase supplies.

For 220/240V	Each	**£17·50** *bx*
For 200/210V	Each	**£17·50** *bx*
For 110/120V	Each	**£17·50** *bx*

TM-516

THERMOSTAT KIT, *Compenstat, Gallenkamp*, as TM-515 but range 40 to 250°C. For 50/60 Hz single phase supplies.

For 220/240V	Each	**£17·50** *bx*
For 200/210V	Each	**£17·50** *bx*
For 110/120V	Each	**£17·50** *bx*

When ordering Thermostat Kits please state voltage and frequency of supply.

TM-790

THERMOSTAT, general purpose, 20–110°C. An hydraulic thermostat for building into equipment where a fluctuation of nominally 5degC is adequate. Especially suitable for use as a safety thermostat. Incorporates a single pole switch for ON/OFF switching of up to 20A at 250V non-inductive loads. Not recommended for currents below 0·5A. With locating lugs and suitable for fixing by a screwed nosepiece to panels up to 6·5 mm thickness. Capillary length approximately 100 cm. Supplied with knob, escutcheon and instructions for assembly.

Each **£3·30** *cx*

BIMETAL THERMOSTATS

These thermostats operate by means of a helix of bimetal fixed at one end to a stem and the other end to an operating rod. A change of temperature causes the helix to twist and this motion is transmitted to the switch within the head.

The switch differentials quoted are the changes of temperature which will cause the thermostats to open or close, and not the performance of the apparatus to which they are fitted.

Although set for optimum performance when supplied, the contact pressure, and hence the differential can be increased or decreased.

The thermostats have arbitrary scales and stems, are virtually rustless and only require a protective pocket if inserted through the side of a bath, below the liquid level.

For the best results a relay should be used, since a low control current results in close control and satisfactory service over long periods of time. A relay is essential for Type TS3. Type TS8 will operate up to 2·5A a.c. of 0·1A d.c. at 250V without a relay.

Suitable relays see EC-980 and ED-101 in List No. sequence.

List No.	Type	Max. temp. °C	Range of adjustment °C	Differential degC	Stem lengths cm	Each	
TM-800	TS1	300	40	0·5	15	**£ 7·35**	*fx*
TM-810 **TM-812**	TS2	300	120	0·5	15 30	**7·35** **8·15**	*fx* *fx*
TM-820	TS3	150	40	0·2	25	**7·80**	*fx*
TM-830	TS8	300	250	1·0	25	**9·55**	*fx*

All stock instruments have contacts normally closed, opening with temperature rise, i.e. suitable for heater operation.

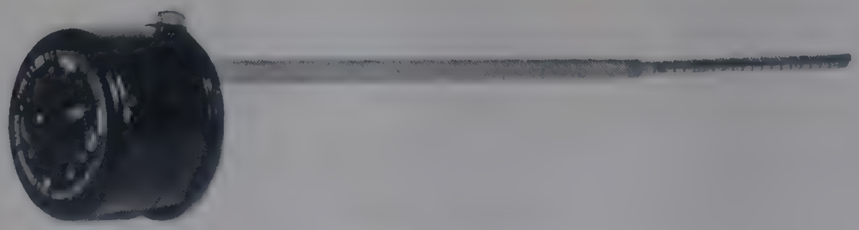
ACCESSORIES

TM-835 **Pockets,** brass, electro-tinned.

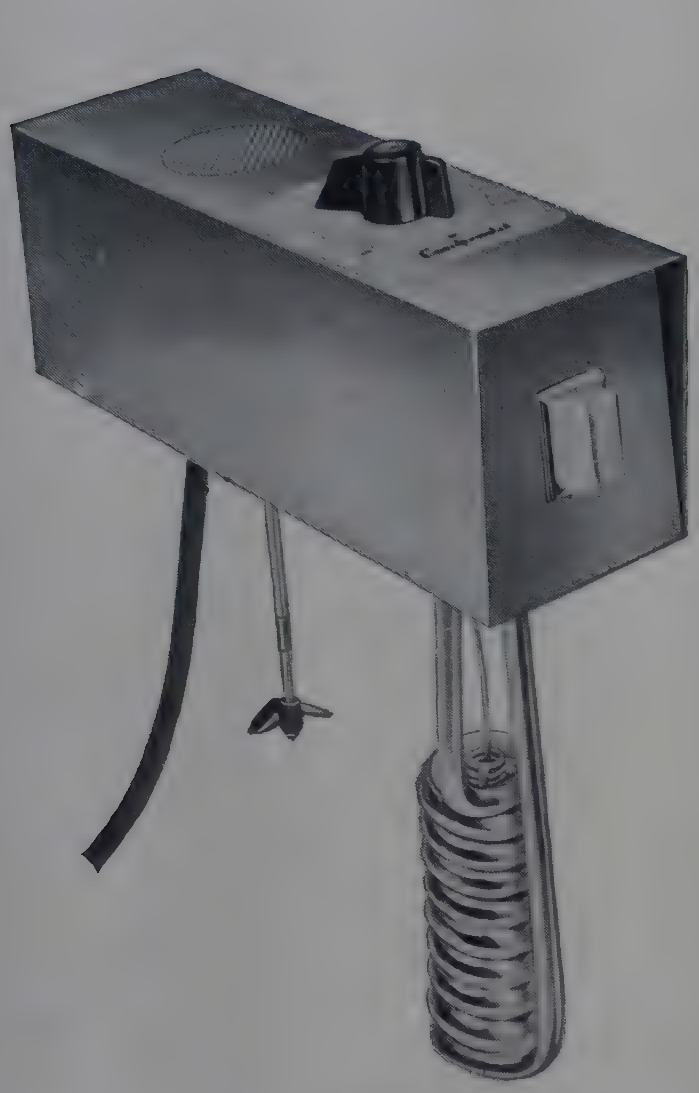
Length, approx.	15	25	30 cm	
Each	**£1·30**	**2·05**	**2·05**	*fx*

TM-790

AQUARIUM THERMOSTAT see BL-135 in List No. sequence.



TM-800 to TM-830



TM-840

OPERATION

The Thermo Stirrer is mounted on a filled water or oil bath by means of either the retort rod fitting or the adjustable clamp (see Accessories). The operator sets the required control temperature on the *Compenstat* scale and switches on the mains supply. The Thermo Stirrer agitates the bath liquid continuously and heats it to the control temperature. A load indicator lamp shows the ON/OFF cycling of the heater which occurs as the control temperature is maintained. An accessory pump, which is driven by the motor in the Thermo Stirrer, is available for circulating water to external apparatus.

DIMENSIONS	H W D
Control box	12 × 8 × 28 cm
Overall	30 × 8 × 28 cm
Minimum essential depth of bath	18 cm
Clearance between underside of case and water level	
Maximum	5·0 cm
Minimum	1·5 cm
Weight	3 kg
Power rating, max.	1500W

Gallenkam

For converting suitable tanks into temperature controlle water or oil baths. Both models incorporate heater thermostats and efficient stirrers which can be converte into pumps for the external circulation of water at controlle temperatures.

THERMO STIRRER I

- **Temperature controlled by** *Compenstat*
- **Stainless steel outer case**
- **1500W sheathed immersion heater**

PERFORMANCE

The powerful stirrer and heater combine with the sensitive *Compenstat* controller to provide good performance to even the simplest bath. For example, glass tanks filled with liquid can be controlled over a wide range of temperature **with a fluctuation of 0·4degC or less** and a variation of 0·3degC or less in the working space.

BATH DESIGN

For optimum performance from the Thermo Stirrer, the following points are relevant when selecting the bath:

1. The bath should be regular in shape with comparable length, breadth and depth.
2. It should be large enough to allow free circulation around the load (in this connection it is often useful to incorporate a "false floor").
3. For use above 50°C, it should be insulated and fitted with a cover to reduce evaporation losses.
4. For use at or near ambient temperature, a cooling coil should be used.

TM-840

THERMO STIRRER I, *Gallenkamp*, as specification including *Compenstat*, motor driven stirrer, and sheathed heater but **without retort rod mount or adjustable clamp.** For single phase a.c. supplies only.

For 220/240V	Each	**£45·50**	*bx*
For 200/210V	Each	**£45·50**	*bxN*
For 110/120V	Each	**£45·50**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

WF-363	**Stirrer motor**	For prices see entries in List No. sequence.
WF-365	**Heating element, 1500W**	

When ordering replacement parts please state serial number of Thermo Stirrer and supply voltage.

ACCESSORIES

TM-844	**Retort rod mount.** This fitting enables the unit to be mounted from a retort stand or scaffold by means of a bosshead	Each	**£1·30**	*bx*
TM-846	**Clamp, adjustable.** This clamp enables the unit to be mounted on the rim of a water bath. Adjustable for wall thicknesses between 0·5 cm and 3 cm ...	Each	**£2·30**	*bx*
TM-848	**Constant level device,** for clamping to water bath or tank	Each	**£5·50**	*fx*
WF-376	**Pump,** for circulating water to external apparatus ...	For full details and prices see entries in List No. sequence.		
TB-600	**Tanks,** *Pyrex* glass ...			

THERMO STIRRERS

- **Temperature range from ambient plus 5degC to 100°C**
- **Quiet and reliable operation**
- **Suitable for a wide range of water bath sizes**
- **Direct reading thermostats**

THERMO STIRRER 2

- **Temperature controlled by contact thermometer and solid state relay**
- **Stainless steel outer case**
- **1000W heater on standard model. 1500W accessory heater available**

PERFORMANCE

With the standard 1000W heater this Thermo Stirrer will provide high performance in simple baths. For example, a glass tank filled with liquid can be controlled from ambient to 90°C **with fluctuation of 0·05degC or less** and a temperature variation of 0·3degC or less. Long term stability is excellent.

The accessory 1500W heater TM-874 (available only for 200/210 and 220/240V) is for use with larger baths and heavier work loads. It replaces the standard heater in use.

BATH DESIGN

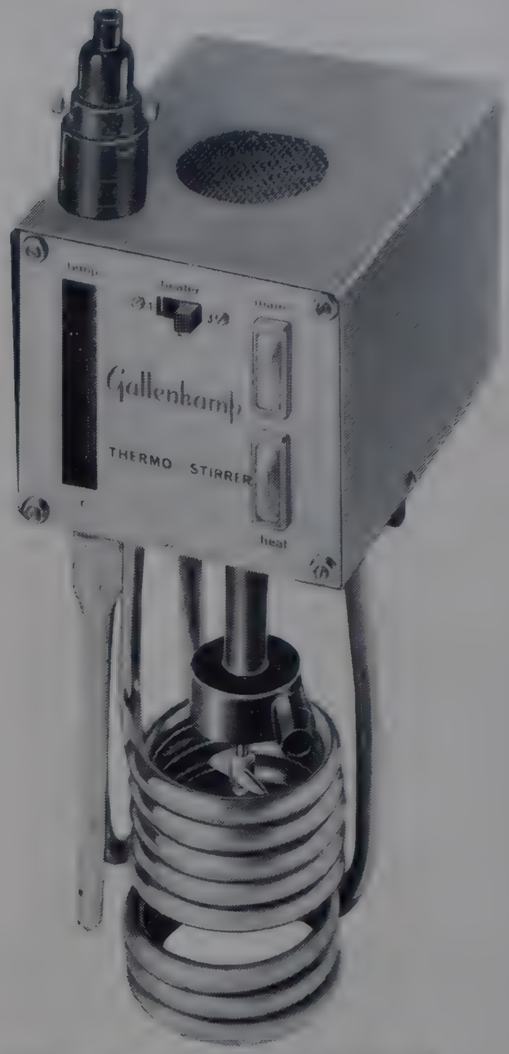
The notes concerning bath design on the opposite page apply also to this Thermo Stirrer.

OPERATION

Three heater powers and switching modes may be selected to allow adjustment for minimum temperature fluctuation. The three settings are:

Full power switched on and off by the thermostat.
Half power switched on and off by the thermostat.
Half power on continuously and the other half power switched on and off by the thermostat.

DIMENSIONS	H		W		D	
Overall, without contact thermometer	26	×	12	×	21	cm
Overall, with contact thermometer fitted	33	×	12	×	21	cm
Minimum essential depth of bath					16	cm
Clearance between underside of case and water level						
Maximum					7	cm
Minimum					3	cm
Weight					2	kg
Power rating, max.					1000W	
Power rating, with 1500W accessory heater					1500W	



TM-860 with TM-870 and WF-376

TM-860

THERMO STIRRER 2, *Gallenkamp,* as specification with motor driven stirrer, 1000W heater, and solid state electronic switching. Complete with contact thermometer range 0–100°C. For single phase a.c. supplies only.

For 220/240V 50 Hz	Each	**£55·00**	*bx*
For 220/210V 50 Hz	Each	**£55·50**	*bxN*
For 110/120V 60 Hz	Each	**£55·50**	*bxN*

When ordering please state voltage and frequency of supply

REPLACEMENT PARTS

TM-864	**Heating element,** 1000W	Each	**£5·25**	*bx*
TM-866	**Contact thermometer,** range 0–100°C.	Each	**£10·50**	*bx*
WF-363	**Stirrer motor.** For details and prices see entry in List No. sequence.			

When ordering replacement parts please state serial number of Thermo Stirrer and supply voltage.

ACCESSORIES

TM-870	**Cooling coil,** with fixing plate ...	Each	**£4·75**	*bx*
NOTE:	**This accessory increases the minimum essential working depth of the bath to 20 cm.**			
TM-872	**Holder for mercury in glass thermometer.**	Each	**£1·05**	*bx*
TM-874	**Heater,** 1500W **not available for 110/120V.**	Each	**£5·00**	*bx*
TM-844	**Retort rod mount.** For price see entry in List No. sequence.			
TM-848	**Constant level device**	For full details and prices see entries in List No. sequence.		
WF-376	**Pump,** for circulating water to external apparatus			
TB-600	**Tanks,** *Pyrex* glass			

Gallenkamp THERMOSTATIC WATER CIRCULATOR

Range near ambient to 80°C

A self-contained apparatus for pumping temperature controlled water and other suitable fluids through external apparatus

Applications include the maintaining of constant temperature for viscosity, spectrophotometry, polarimetry, refractometry and other measurements and circulation through water jackets, condensers, constant temperature coils and open tanks.

- **Solid State *Compenstat* temperature controller**
- **Direct reading temperature scale**
- **Powerful heater provides rapid heat-up**
- **Robust, reliable circulating pump**
- **Compact, light weight overall design**

Gallenkamp
mains
load
safety
off
on
bleed
cooling
in
out
flow
out
drain
WATER CIRCULATOR
Compenstat

TM-920

Gallenkamp

REFRIGERATED THERMOSTATIC BATH

with integral pump to circulate bath fluid to external apparatus

- **Bath capacity 35 litres**
- **Temperature range −20 to +50°C**

For details and price see WF-721 in List No. sequence.

CONSTRUCTION

The water is heated by sheathed heater inside a stainless steel tank contained in the circulator. Its temperature is accurately controlled by means of a solid state *Compenstat* with direct reading scale; a safety cut-out is incorporated which operates at about 85°C.

Nozzles in the end-plate of the tank act as inlet and outlet and also as filling, draining and overflow ports. The tank is fitted with a cooling coil through which tap water or other coolant may be run for operation near ambient temperature. This facility enables thermostatted water to be circulated at a few degrees below ambient provided cold mains water is available.

The water is pumped by an efficient, reliable, centrifugal pump which is directly coupled to a brushless motor. The pump is not damaged if the flow of water is stopped when the motor is still running. Care should be taken if pumping liquids other than water that these will not cause the gaskets or pump to deteriorate.

The apparatus is fitted with a combined mains switch and indicator lamp, a load lamp to show the operation of the thermostat and a safety cut-out indicator lamp.

PERFORMANCE

The solid state *Compenstat* enables the operator to bring the water in the circulator to the correct temperature. The apparatus to be heated, however, may stabilise at a lower temperature due to heat losses in the circulation system. The *Compenstat* must then be adjusted until the external apparatus reaches the desired temperature.

Should the solid state *Compenstat* fail, the safety cut-out operates at about 85°C and must be manually reset after the fault has been cured.

The circulator can be used in conjunction with sealed external apparatus such as a water jacket or open systems, e.g. an aquarium.

TECHNICAL DATA

Temperature range	near ambient to 80°C
Temperature fluctuation	less than ±0·05degC
Heating rate	10degC/min at no load
Internal tank capacity	2·5 litres
Ambient temperature rejection	1degC for 30°C change in ambient
Heater rating	750W
Pumping rate	5 litres/min at zero head
Pumping head	2·5 metres max
Nozzles, dia.	10 mm and 14 mm
	H W D
Dimensions, overall	20 × 27 × 32 cm
Net weight	8 kg

TM-920

THERMOSTATIC WATER CIRCULATOR, *Gallenkamp*, **80°C** as specification. Comprising 2·5 litre stainless steel reservoir tank, 750W heater, centrifugal pump, cooling coil, direct reading *Compenstat* (solid state) thermostat and safety cut-out.

For 220/240V 50 Hz single phase supplies	Each **£87·00** *bx*
For 110/120V 60 Hz single phase supplies	Each **£90·00** *bxN*

ACCESSORIES

CP-285	**Tubing clips**	For details and prices see entries in List No. sequence.
TX-750	**Tubing, neoprene rubber,** N10 and N12·5	
TX-854	**Tubing connectors**	

REFRIGERATED THERMOSTATIC WATER CIRCULATOR

Temperature range	−5 to +60°C
Temperature fluctuation	±0·2degC
Pumping rate at zero head	4·5 litres/min
Maximum head	2 metres
Heat extraction rate of circulating water at 0°C with operating temperature of 20°C	200 Kg. cal/hr approx.
Overall dimensions	51 × 31 × 60 cm high
Weight, net	46 kg

TM-975

THERMO-CIRCULATOR, *Churchill*, as specification, comprising 4 litre reservoir, 1/5 hp refrigeration unit, 500W heater and direct reading temperature indicator-controller. Suitable for use in ambient temperatures up to 30°C. For 220/240V 50 Hz single phase supplies.

Each **£209·00** *fxN*

TM-975

REFRIGERATED PROBES see RJ-450 et seq. on page 596

THICKNESS MEASUREMENT

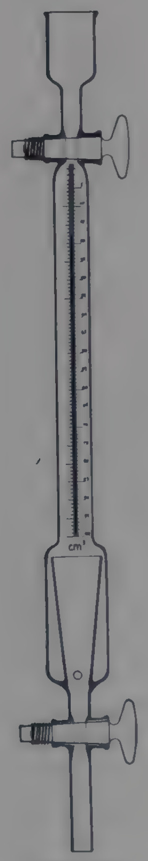
TP-530

GASOMETRIC APPARATUS, *Technico*, to BS 443, for determination of the thickness of galvanised coatings on wire. Comprises 100 cm³ burette subdivided in 0·5 cm³ with bulb, two stopcocks and a tubulure for connection to a levelling bulb. **Main glass part only.**

Each **£9·90** *ax*

ACCESSORY

MF-920 **Mercury reservoir** levelling bulb, capacity 150 ml. For price see entry in List No. sequence.



TP-530

TP-535

THICKNESS GAUGE, *Elcometer*, **Inspector,** scale range 0 to 500 µm. A hand-operated instrument for direct thickness measurements of non-magnetic coatings on ferro-magnetic bases. Readings are accurate to ±10%.

Each **£36·00** *fx*

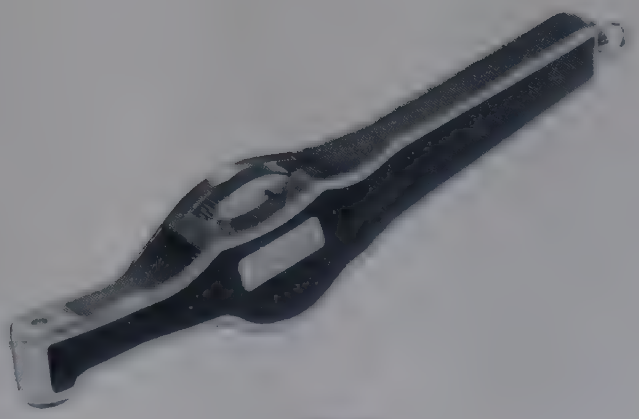
CALIPER GAUGES see GJ-100 to GJ-120
MICROMETER GAUGES see GJ-200 and GJ-205

Gallenkamp

THIN FILM EVAPORATOR

- **Rapidly removes solvents from solutions when vacuum and gentle heating applied.**
- **Especially useful with heat-sensitive materials.**

For details and prices see EU-100 et seq. in List No. sequence.

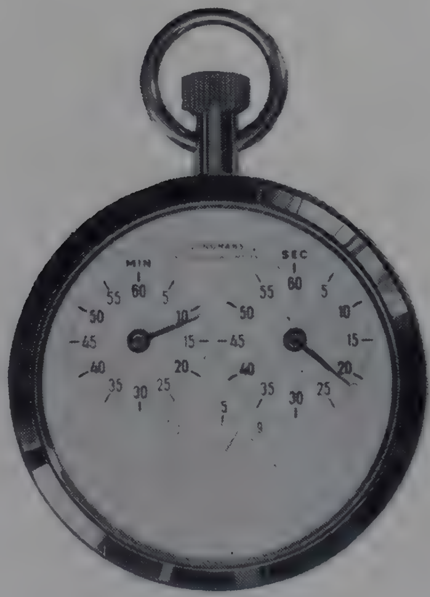


TP-535

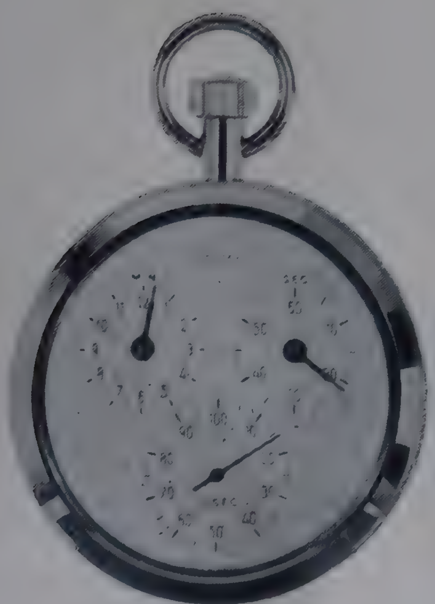
TR-010

TR-015

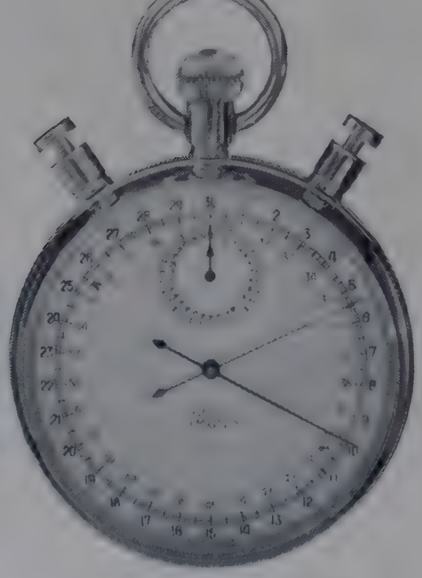
TR-022



TR-030



TR-037



TR-050

STOPWATCHES

***TR-010**

STOPWATCH, wrist fitting, 30 minutes total with 60 second main dial divided in 0·2 second intervals. Start/stop and reset buttons are on the same side as the winder. Incorporates 24 hour watch with subsidiary seconds dial. Jewel lever movement in stainless steel case with wrist strap ... ... Each **£17·00** *mx*

***TR-015**

STOPWATCH, general purpose, 30 minutes total, with 60 second dial divided in 0·2 second intervals. Start and stop by consecutive pressures on the winder and reset by press movement at the side. Jewel lever movement in chromium plated case... ... ... Each **£9·25** *mx*

***TR-022**

STOPWATCH, general purpose, 15 minutes total, with 30 second dial divided in 0·1 second intervals. Start, stop and reset by consecutive pressures on the winder. Jewel lever movement in chromium plated case.

Each **£9·50** *mx*

***TR-030**

STOPWATCH, precision, 60 minutes total, with three separate dials for minutes, seconds and 0·1 seconds. Start, stop and reset by consecutive pressures on the winder. The 0·1s indicator stops only on the graduations thus facilitating exact readings. Jewel lever movement, in chromium plated case.... ... ... Each **£20·00** *mx*

***TR-037**

STOPWATCH, precision, 12 minutes total, with three separate dials for minutes, seconds and 0·01 second intervals. Start, stop and reset by consecutive pressures on the winder. The 0·01s indicator stops only on the graduations thus facilitating exact readings. Jewel lever movement in chromium plated case ... Each **£29·00** *mx*

***TR-050**

STOPWATCH, multiple timing, split second with main 30 second dial subdivided in 0·1 seconds and subsidiary dial for up to 30 minutes. Rated and calibrated to NPL standards for certification. The watch has two coaxial seconds hands, which can be operated together by the right hand button as on a conventional watch. In addition one hand can be stopped and made to rejoin the other, which runs steadily, by pressing the left hand button. A number of concurrent tests can therefore be timed with one watch. The central knob is used to wind the watch and return the hands to zero. With dial cover.

Each **£68·50** *mx*

TR-060

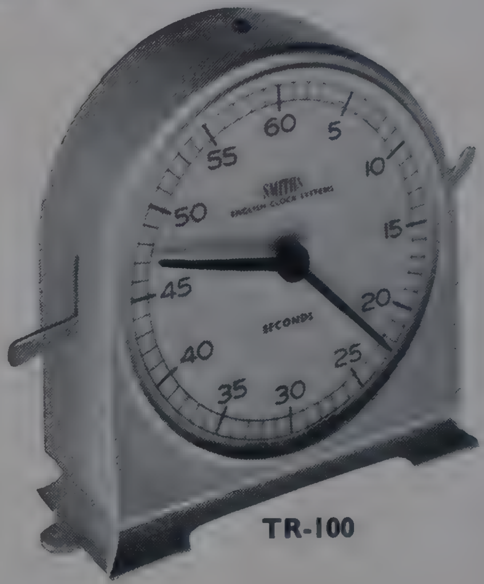
STOPWATCH HOLDER, with push button operation for start, stop and reset by a simple mechanism which is adjustable for different size watches and which always gives a positive action. Comprises an aluminium die casting finished in hard enamel with polished plated fittings. **Without stopwatch** ... ... Each **£3·00** *fx*

TR-060 (with stopwatch)

STOPCLOCKS

TR-100

STOPCLOCK, *Smiths*, with two hands indicating 60 minutes and 60 seconds total respectively on a 10 cm diameter dial. There is a stop and start lever on the left hand side and a reset lever on the right. The clock is spring driven and will run for about 30 hours with one winding. The dial is protected by a cover and the stove enamelled case has holes for securing to the bench.
Each **£4·52** *mx*



TR-100

***TR-110**

STOPCLOCK, with two hands indicating 60 minutes and 60 seconds total respectively on a 10 cm diameter dial. With start, stop and reset push buttons on the top of a plastics case. The clock is spring driven and will run for about 4 hours with one winding. The dial is protected by a cover and the case is fitted with a foot for bench mounting ... ... Each **£9·60** *mx*

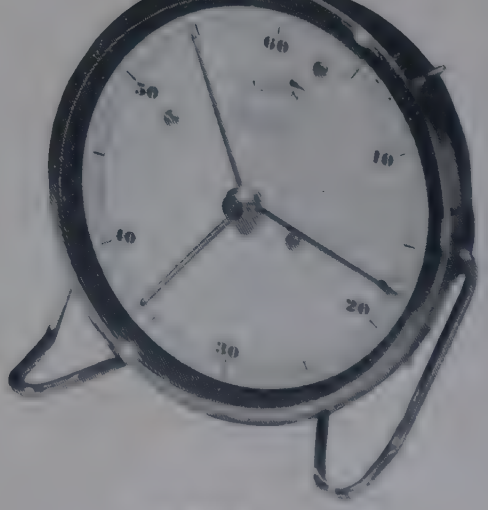
60
5
10
15
20
25
30
35
40
45
50
55
TR-110

TR-120

STOPCLOCK, with two hands indicating 60 minutes and 60 seconds total respectively, on a 14 cm diameter dial, and with a third index pointer operated by knurled knob in the centre of the glass window. Minute hand set by one control knob while both hands started or stopped by a side lever. Spring driven lever movement which will run for about 30 hours with one winding. In plastics case with chromium plated bezel, dial cover and stainless steel foot. For bench standing or wall mounting.
Each **£11·50** *fx*

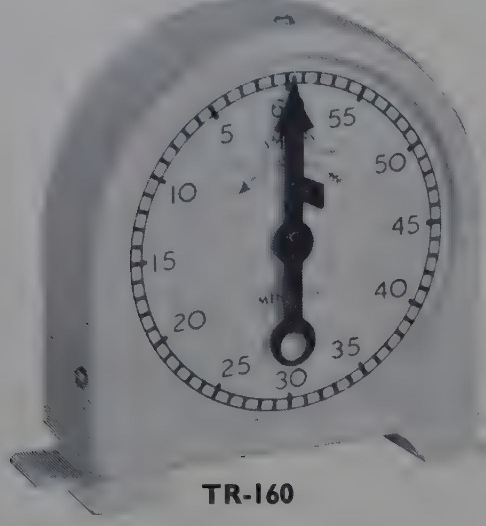
TR-125

STOPCLOCK, indicating 60 seconds total on the main 14 cm diameter dial with a subsidiary dial indicating 60 minutes total. Start and stop by side lever movement and reset by depressing a plunger above the main dial. Spring driven lever movement which will run for about 30 hours with one winding. In plastics case with chromium plated bezel, dial cover and stainless steel foot. For bench standing or wall mounting.
Each **£12·50** *fx*


TR-120

WALL CLOCKS see FY-948 and FY-949 in List No. sequence.

INTERVAL TIMERS



TR-160

TR-150

INTERVAL TIMER, *Smiths*, for timing any period up to 60 minutes, the end of the period being signalled by a long bell ring. With indicator which is turned to the required period thereby winding and starting the clock mechanism. In plastics case with 5 cm diameter dial. Each **£2·04** *mx*

TR-160

INTERVAL TIMER, *Smiths*, for timing any period up to 60 minutes, the end of the period being signalled by a long bell ring. With indicator which is turned to the required period thereby winding the spring driven lever movement and starting the clock. In metal case with 10 cm diameter dial ... ... Each **£4·74** *mx*

SMITHS
INTERVAL TIMER

TR-165

TR-165

INTERVAL TIMER, *Smiths*, for timing any period from ¼ minute to two hours, the end of the period being signalled by a ten second bell ring. The period required is set by a control knob which moves the minute and second pointers. The spring driven lever movement is wound by one side lever while the other side lever energises the alarm. One winding enables the clock to run for 30 hours. In metal case with 9 cm diameter dial. Each **£4·74** *mx*

PROCESS TIMER SWITCHES

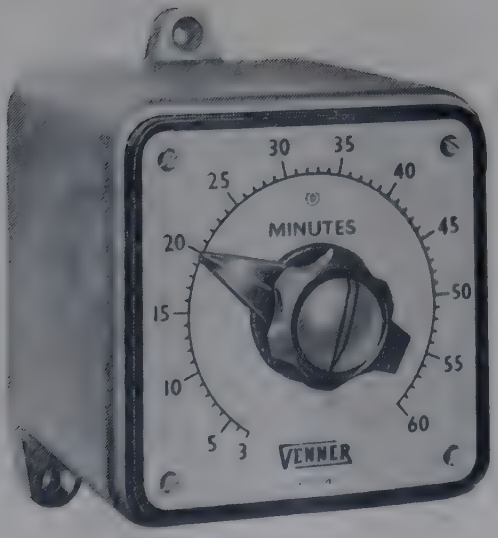
MANUAL ON, AUTOMATIC OFF

VENNER
MINUTES

TR-262

TR-262

PROCESS TIMER, *Venner*, spring driven, panel mounting, for switching off electrical apparatus after an elapsed time up to 60 minutes, and, simultaneously, to give visible or audible warning by connection to suitable lamp or bell circuit. Incorporates a spring operated movement with a 4 cm dia. dial on which the required period is set by turning the central indicator to an adjustable stop. With 5A single pole change-over switch. For 250V a.c. or 24V d.c. supplies. Each **£11·20** *mx*



TR-265

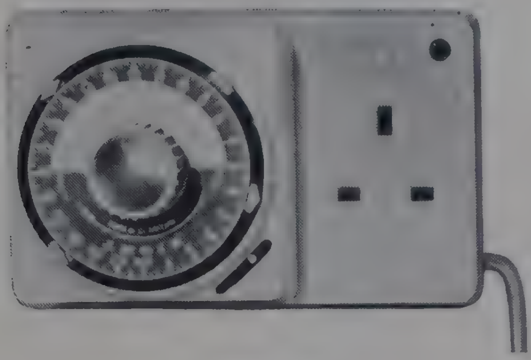
TR-265

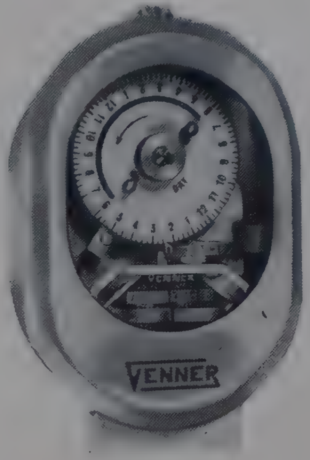
PROCESS TIMERS, *Venner*, electrically driven, surface mounting for switching off electrical apparatus after an elapsed time. This synchronous motor driven timer is operated by a push button which also indicates elapsed time. The timing interval is set by a lockable pointer. The timer resets automatically after each cycle. With 15A changeover contacts, for 200/250V 50 Hz single phase supplies.

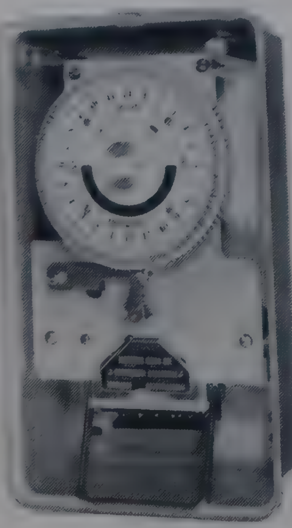
Timing range	3–60 minutes	1–20 hours	3–60 hours	
Each	**£11·50**	**11·50**	**11·50**	*mx*

DAILY CYCLE TIMER SWITCHES

TR-290


TR-295


TR-314


TR-360

All models have

- **Self starting synchronous electric motors for operation on 200/250V, 50 Hz frequency controlled mains**
- **24 hour dials divided every 15 minutes**

All models except TR-360 have a manual override switch.

†**Time Switch TR-360** is for multiple switching by means of 96 tabs at 15 minute intervals round the dial. These tabs are easily raised, when each provides a 15 minute ON period, adjacent raised tabs providing continuous ON periods. The timer is thus very versatile for many laboratory purposes and can provide regular or irregular switching in any multiple of 15 mins throughout the 24 hours.

List No.	Timing levers	Minimum switching period ON/OFF (minutes)	Output connection	Rating (A)	Day selector	Indicator lamp	Mounting	Each	
TR-290	2 pair	75/75	Cable	15	Yes	No	Wall	£ 5·55	*mx*
TR-295	2 ,,	60/60	13A 3-pin socket	13	No	Yes	Wall or Bench	6·50	*mx*
TR-314	2 ,,	30/15	Cable	30	Yes	No	Wall	8·30	*mx*
TR-360	96 tabs†	15/15	Cable	10	No	No	Wall	17·55	*mx*

† see above.

Gallenkamp

TIME/TEMPERATURE CYCLING INCUBATORS

- **Fan convection models, temperature range approx. 25 to 100 C**
- **Cooled models, temperature range approx. 0 to 45°C**

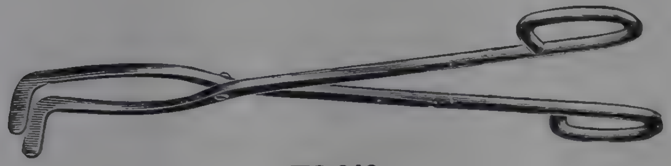
For details and prices see IH-102, IH-277 and IH-287 in List No. sequence.

Gallenkamp TITRATION APPARATUS

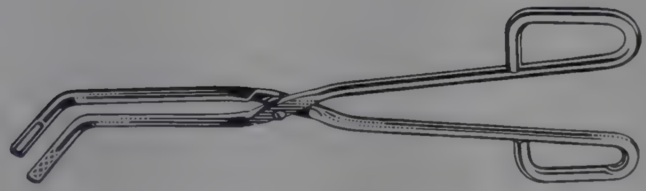
Gallenkamp
TITRATION POTENTIOMETER
potentiometric
differential
dead stop
off
titration
sensitivity
balance
calibration
ext
meter

EJ-890	Titration potentiometer.
EJ-920 and EJ-925	Titration stand assemblies with or without hotplate.
FX-500 to FX-511	Titration benches.

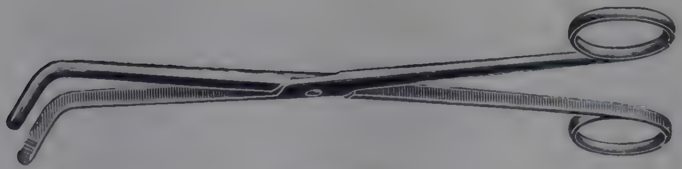
For full details and prices see entries in List No. sequence. See also page headings **Burettes, Flasks** and **Pipettes.**



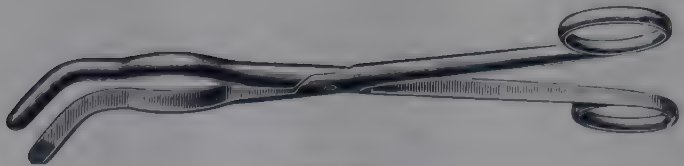
TS-212
TS-214
TS-218



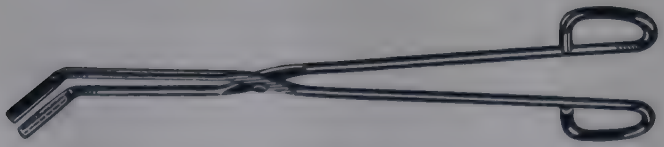
TS-216



TS-220
TS-224



TS-222
TS-226



TS-230

TONGS

TS-212

TONGS, crucible, blackened steel, with bow, student's pattern. Length 20 cm ... Ten **£2·35** Each **£0·30** *cx*

TS-214

TONGS, crucible, brass, with bow and flattened wire hinge. Length 20 cm ... Ten **£3·60** Each **£0·42** *cx*

TS-216

TONGS, crucible, stainless steel, straight, with flattened wire hinge. Length 20 cm.
Ten **£5·40** Each **£0·60** *cx*

TS-218

TONGS, crucible, stainless steel, with bow and flattened wire hinge. Length 20 cm.
Ten **£5·40** Each **£0·60** *cx*

***TS-220**

TONGS, crucible, stainless steel, with bow and forged scissors type hinge. Length 20 cm.
Ten **£13·00** Each **£1·45** *cx*

***TS-222**

TONGS, crucible, stainless steel, with bow and forged scissors type hinge. Length 20 cm.
Ten **£13·00** Each **£1·45** *cx*

TS-224

TONGS, crucible, stainless steel as TS-220, fitted with platinum shoes, straight. Length 20 cm
Each **£32·50** *mx*

TS-226

TONGS, crucible, stainless steel as TS-222, fitted with platinum shoes, with bow. Length 20 cm.
Each **£32·50** *mx*

TS-230

TONGS, furnace, blackened steel, straight with flattened wire hinge. Length 38 cm.
Ten **£7·60** Each **£0·84** *cx*

TONGS

TS-240

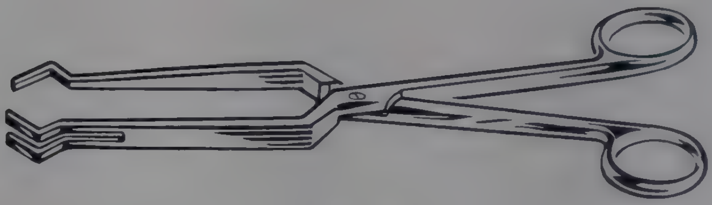
TONGS, furnace, Ward pattern, stainless steel, for handling a wide variety of crucibles. etc. especially in tube furnaces. Operated by thumb action with one hand and fitted with a circular shield to protect the hand against radiation from the furnace.

Length to shield	41	56 cm
	16	22 in
Overall length	59	74 cm
	23	29 in
Each	**£6·00**	**7·00** *bx*

TS-240

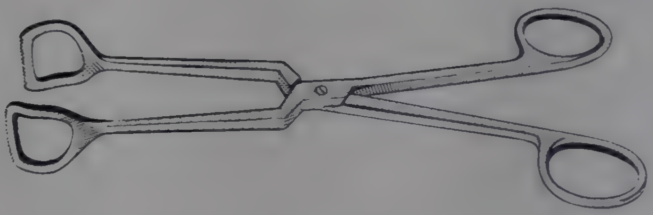
***TS-250**

TONGS, general purpose, stainless steel. With scissor hinge and finger claws giving a firm but sensitive three point grip, suitable for test tubes, electrodes, thermometers, small flasks and beakers, slides, etc. Overall length 21 cm ... ... Each **£1·70** *bx*


TS-250

***TS-258**

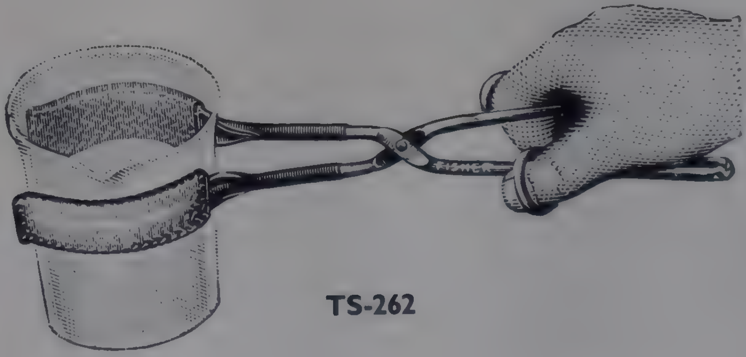
TONGS, general purpose, stainless steel. These tongs have a wide variety of applications and will hold thin pieces of paper, tubes over 2 mm diameter or small beakers up to 150 ml. Overall length 20 cm with 2·5 cm serrated jaws ... ... Each **£1·60** *cx*


TS-258

TS-262

TONGS, Fisher pattern, **for beakers,** stainless steel. These tongs will firmly grip and safely incline any beaker from 100 to 1500 ml. The 2·5 cm wide jaws are lined with replaceable asbestos covers which prevent slipping and thereby reduce the risk of breakage. Overall length 33 cm ... ... Each **£2·85** *mx*

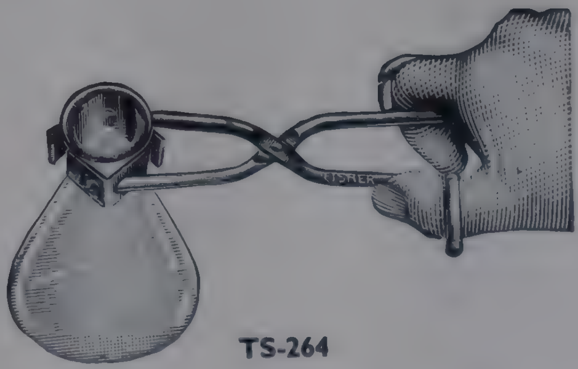
TS-263 **Asbestos jaw covers,** replacement for tongs TS-262 Pair **£0·17** *mx*



TS-262

TS-264

TONGS, Fisher pattern, **for flasks,** stainless steel. These tongs will firmly grip flasks of any shape from 100 to 2000 ml. One of the rectangular V-shaped jaws is smaller than the other ensuring a safe grip. The tong handles extend beyond the finger holds thus ensuring the entire weight of the flasks is supported by the palm of the hand. Overall length 23 cm ... ... Each **£2·70** *mx*

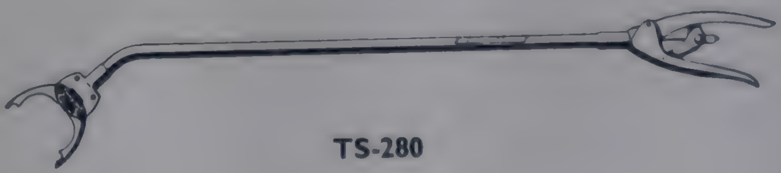


TS-264

TS-280

TONGS, REMOTE HANDLING, *Cee-Vee*, a long-arm reacher. The cork-lined jaws are so designed that various sized articles may be picked up safely. Maximum jaw opening 6·3 cm.

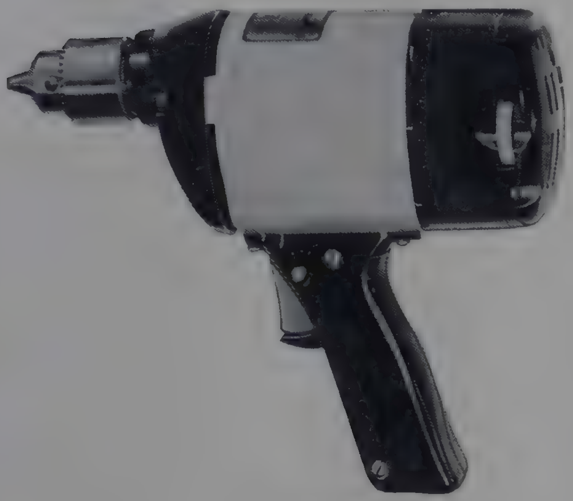
Length of arm	75	125	200 cm	
Each	**£5·00**	**5·50**	**6·35**	*mx*


TS-280

TOOLS

TT-040

TT-040
CLAMP, 'G', steel frame and screw. With handle and swivel show. Opening to 10 cm ... Each **£1·75** *fx*



TT-070

TT-075

TT-070
DRILL, electric, variable speed, with $\frac{3}{8}$ in 3-jaw key chuck. Speeds variable between 900 and 3000 rev/min. Load 340W. Net weight 1·5 kg. For 230/250V a.c. single phase supplies ... ... Each **£16·50** *fx*

ACCESSORY

TT-075 **Drill stand.** With depth control stop. Overall height 75 cm, depth of feed 7 cm, maximum height between chuck and table 50 cm ... ... Each **£8·45** *fx*

TT-080

TT-080
DRILL BRACE, hand, capacity 0 to $\frac{1}{4}$ in, with double pinion, ball thrust and machine cut gears. In iron frame with polished hardwood handle ... ... Each **£3·00** *mx*

TT-082
DRILLS, high speed steel, set of seven $\frac{1}{16}$ to $\frac{1}{4}$ in by $\frac{1}{32}$ in, in metal box ... ... Set **£0·94** *fx*

TT-110
FILE, round, bastard cut, length 20 cm, with handle.
Ten **£4·90** Each **£0·54** *mx*

TT-112
FILE, three square, second cut, length 15 cm, with handle ... ...Ten **£5·50** Each **£0·60** *mx*

TT-130

TT-130
HACKSAW, adjustable, tubular frame for 9 to 12 in blades ... ... Each **£1·32** *mx*

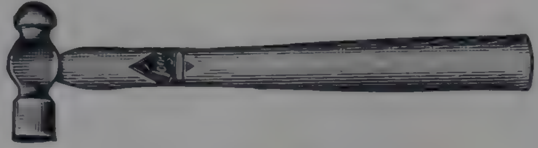
TT-131
BLADES, hacksaw, high speed steel, length 12 in, width 0·5 in, thickness 0·025 in, 24 teeth per inch. In pack of 10.
10 packs **£14·25** Pack **£1·60** *fx*

TT-140

TT-140
SPECIMEN ENGRAVER, a portable, solenoid-operated vibro tool for engraving metallurgical specimens. For 230/250V 50 Hz single phase supplies. Complete with hard point engraving head ... ... Each **£5·50** *mx*

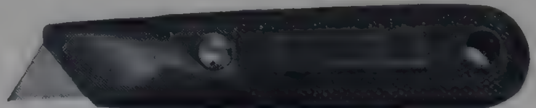
REPLACEMENT PARTS AND ACCESSORIES

TT-142	**Hard point**	Each	£0·25	*mx*
TT-143	**Extra hard point**	Each	£0·30	*mx*
TT-144	**Diamond point**	Each	£2·25	*mx*



TT-150

TT-150
HAMMER, engineers, with ball pein and hickory handle. Weight $\frac{1}{2}$ lb ... ... Each **£0·85** *mx*



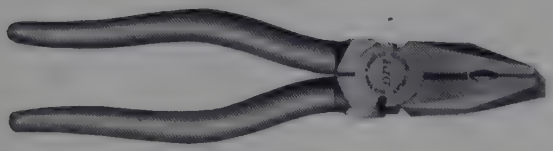
TT-160

TT-160
KNIFE, trimming, with 5 cm reversible steel blade held in alloy handle. With five spare blades inside handle and blade guard ... ... Each **£0·35** *fx*

TT-200

TT-200
MIRROR, dental type, 25 mm dia. mirror with anodised aluminium handle, 15 cm long overall ... Each **£0·30** *mx*

TOOLS



TT-250

TT-250
PLIERS, combination, with knurled insulated handles. length 17·5 cm ... ... Each **£1·10** *mx*

TT-254

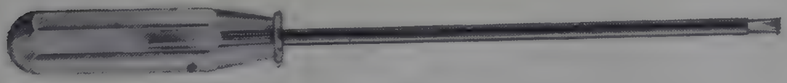
TT-254
PLIERS, snipe nose, insulated handle, length 14 cm. Each **£1·04** *mx*

TT-256

TT-256
PLIERS, side cutting, length 12·5 cm ... Each **£1·25** *mx*

TT-280

TT-280
PUNCH, centre, automatic, with removable point. Length 12 cm, with pocket clip... ... Each **£1·15** *fx*



TT-340

TT-340
SCREWDRIVERS, electricians', insulated, with plastics handle.

Blade length	7·5	10	15	20 cm	
Blade width	3	3	4	5 mm	
Each	**£0·28**	**0·30**	**0·40**	**0·46**	*mx*

TT-344
SCREWDRIVER, heavy duty, 15 cm blade, 10 mm wide. Each **£0·61** *mx*

TT-350
SCREWDRIVERS, Phillips type, with plastics handle.

Point size	1	2	
Blade length	7·5	10 cm	
Each	**£0·36**	**0·40**	*mx*

TT-390

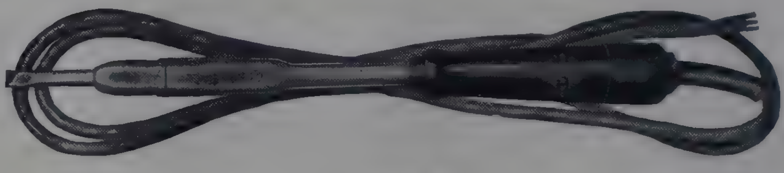
TT-390
SNIPS, tinmans', length 20 cm ... Each **£0·75** *mx*

TT-420

TT-420
SOLDERING IRON, miniature, 15W, with nickel-plated bit, 4 mm diameter tip. Overall length 18 cm. For 220/240V supplies ... ... Each **£1·80** *mx*

TT-430
SOLDERING KIT, with 15W miniature iron, 3 nickel-plated bits diameters of 2·3, 4 and 4·7 mm, solder and heat sink in fitted case. For 220/240V supplies. Each **£2·75** *mx*

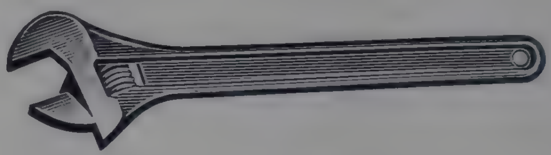
REPLACEMENT AND ACCESSORY FOR TT-420 AND TT-430
TT-435 **Bits, nickel-plated,** 2·3, 4 and 4·7 mm tip diameters. Set of 3 **£0·60** *mx*



TT-440

TT-440
SOLDERING IRON, 65W, with round pencil bit. For 230/250V supplies. Overall length 35 cm. Each **£3·50** *fx*

ACCESSORY
TT-450 **Solder, Multicore,** for electrical use, 60/40 tin/lead, 18 swg. In carton ... ... Each **£0·25** *mx*

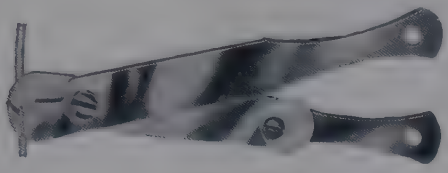


TT-500

***TT-500**
SPANNER, adjustable, 15° angled head. Length 150 mm, jaw maximum opening 20 mm... Each **£1·39** *fx*

TT-510
SPANNERS, B.A., tempered pressed steel, set of six, range 0 to 11 B.A.... ... ... Set **£0·36** *fx*

TT-550
VICE, bench, plain screw type, with interchangeable hardened steel jaw plates; jaw width 8·5 cm, opening 10 cm ... ... Each **£4·80** *fx*



TT-560

TT-560
WIRE CUTTER STRIPPER, preset to avoid damage to conductor when stripping insulation ... Each **£0·30** *fx*

TT-575
WRENCHES, hexagon socket screw, set of eight in plastics case, $\frac{1}{16}$ to $\frac{1}{4}$ in A/F ... ... Set **£0·55** *fx*

TT-577
WRENCHES, hexagon socket screw, set of seven in plastics case, 1·5 to 8 mm A/F ... ... Set **£0·80** *fx*

TOOL KITS

TT-590

TT-590

TOOL KIT, chemists and analysts. A personal set of instruments useful for all actively concerned in chemical analysis. Comprises one each of the following in a plastics wallet.

Brush, dusting
Caliper, boxwood, 10 cm
File, triangular, 15 cm
Forceps, nickel plated steel, 12·5 cm
Magnifier, acrylic, ×2
Pencil, All-Stabilo, black
Platinum wire in glass rod
Scalpel, stainless steel blade
Scissors, nickel plated steel, 15 cm
Spatula, stainless steel, offset spoon, 19 cm
Spatula, stainless steel, Chataway, 15 cm
Spatula, stainless steel, micro Chataway, 15 cm
Spatula, polythene, 12·5 cm
Syringe, plastics, 1 ml with needle ... Each **£5·60** *cx*

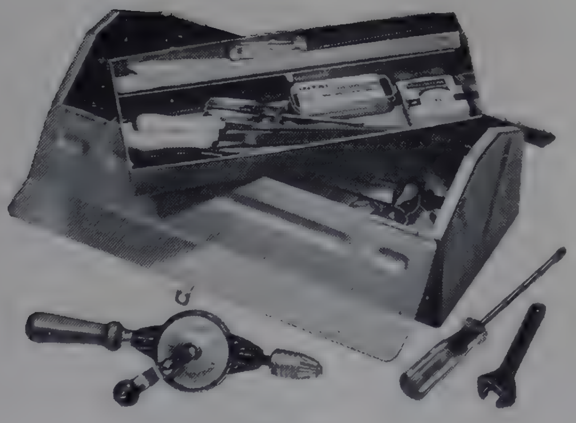
TT-600

TT-600

TOOL KIT, instrument and electronic, comprising one each of the following tools in a plastics roll.

BU-615	Brush, dusting, 12·5 mm
DR-032	Forceps, stainless steel, 12·5 cm
EB-180	Test prod with neon indicator lamp
TT-200	Mirror, dental type
TT-254	Pliers, snipe nose
TT-256	Pliers, side cutting, 12·5 cm
TT-340	Screwdriver, 1 each sizes 7·5, 10 and 15 cm
TT-350	Screwdriver, Phillips type, 7·5 cm
TT-420	Soldering iron, 15W 220/240V
TT-510	Spanners, BA, set of six
TT-560	Wire stripper ... ... Each **£8·50** *mx*

Electrical terminations kit—see EB-220 in List No. sequence.



TT-610

TT-610

TOOL KIT, laboratory workshop, in strong metal case with carrying handle and provision for padlocking. Small tools can be placed in a removable tray. Tool kit TT-600 can be carried inside. Comprises one each of the following tools:—

TT-080	Drill brace
TT-082	Set of drills
TT-110	File, round
TT-112	File, 3-square
TT-130	Hacksaw
TT-131	Pack of blades
TT-150	Hammer
TT-160	Trimming knife
TT-250	Pliers, combination
TT-280	Centre punch
SB-622	Scissors, 18 cm
TT-340	Screwdriver, 20 cm
TT-344	Screwdriver, 15 cm
TT-350	Screwdriver, Phillips type, 10 cm
TT-390	Snips
TT-440	Soldering iron, 65W supplied for 230/250V unless otherwise specified
TT-500	Spanner, adjustable
RX-055	Rule, 10 in
RX-060	Measure, 2 metres
TT-575	Set of hexagonal wrenches, $\frac{1}{16}$ to $\frac{1}{4}$ in A/F
TT-577	Set of hexagonal wrenches, 1·5 to 8 mm A/F

Each **£24·80** *mx*

Other useful 'Tools' will be found under the following page headings:

BLOWPIPES
BRUSHES
DISSECTING
ELECTRICAL
GAUGES
GLASSBLOWING
LIGHTERS
MAGNIFIERS
MEASURES
PENCILS
PLASTICS
PRESSES
RULES
SPATULAS
TACHOMETERS
TUBING

TRAYS

TU-515

TRAYS, high impact polystyrene, white, 2·5 cm deep.

Size	30×15	43×33 cm	
Each	£0·30	0·80	cx

TU-520

TRAYS, rigid PVC, with end handles.

Size	42×22×2·2	57×41×1·6 cm	
Each	£3·15	5·45	mx

TU-532

TRAY, mercury, rigid PVC, with drain hole and plug.

Dimensions 41×32×2 cm ... ... Each **£4·35** *mx*

TU-540

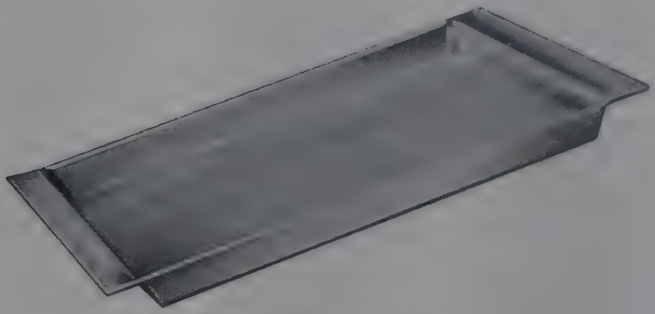
TRAYS, translucent silica, with rim on three sides, suitable for *Gallenkamp* muffle furnaces.

Dimensions	67×114	118×175	152×248 mm	
For muffle	12·5×15	15×23·5	17×38 cm	
Ten	£16·70	30·90	58·80	fx
Each	£1·85	3·40	6·40	

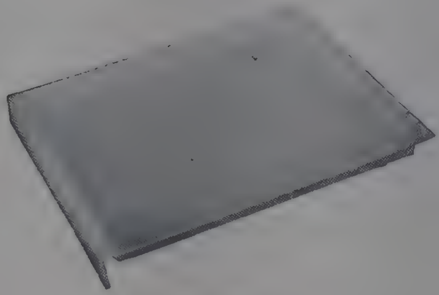
BT-640 TRAYS, bottle
DM-240, DM-250 TRAYS, developing
DM-260, DM-265 TRAYS, dissecting

For details see entries in List No. sequence.

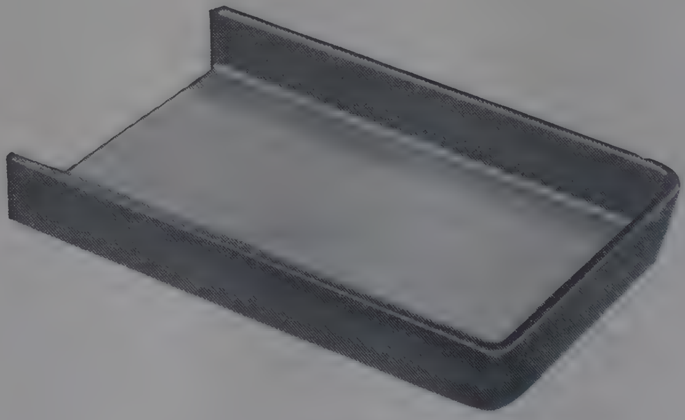
TU-515



TU-520



TU-532



TU-540

TRIANGLES

TV-540

TRIANGLES, iron wire, covered with pipe clay tubes.

Side of triangle	39	50	63	76 mm	
100	£8·00	8·00	9·00	10·00	cx
10	£0·88	0·88	0·98	1·08	
Each	£0·16	0·16	0·17	0·18	

TV-560

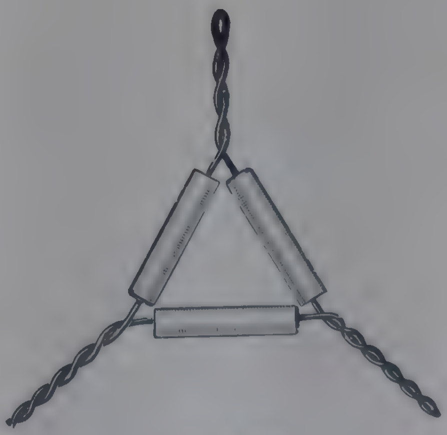
TRIANGLES, nickel-chromium wire, covered with *Vitreosil* silica tubes.

Side of triangle	39	50	63	76 mm	
Ten	£2·60	2·60	3·60	4·50	fx
Each	£0·32	0·32	0·42	0·50	

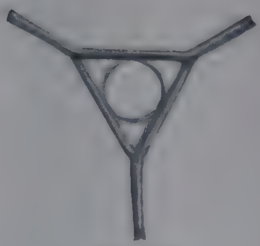
TV-570

TRIANGLES, *Vitreosil* translucent silica, components fused together.

Side of triangle	50	63 mm	
Ten	£10·50	12·00	fx
Each	£1·18	1·35	



TV-540
TV-560



TV-570

SPECIMEN TUBES

TW-600

TUBES, specimen, straight sided, clear glass, with polythene push-in closures.

Length	50	50	50	50 mm	
Diameter	10	12	19	25 mm	
Pack qty. approx.	330	230	220	125	
10 packs	£34·00	31·00	44·00	33·00	
Pack	£ 3·80	3·40	5·00	3·70	cx

Length	75	75	75 mm	
Diameter	12	19	25 mm	
Pack qty. approx.	210	220	125	
10 packs	£31·00	51·00	38·00	cx
Pack	£3·40	5·70	4·20	

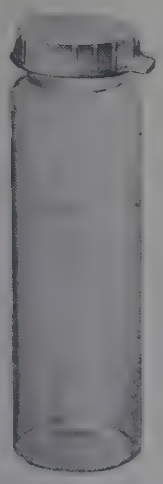
TW-605

TUBES, specimen, straight sided clear glass with bark corks.

Length	50	50	50	75	75	100 mm	
Diameter	10	12	25	19	25	25 mm	
Pack qty.	144	144	72	144	72	72	
10 packs	£10·40	11·40	16·00	19·00	17·00	20·00	cx
Pack	£1·16	1·25	1·80	2·10	1·90	2·20	

TW-600

TW-605



TW-630

TW-650

TW-660 with TW-664

TW-630

TUBES, specimen, straight sided, clear glass, with polythene snap-on closures. Also suitable for use as weighing tubes.

Capacity	5	10	20	30 ml	
Length	25	40	60	70 mm	
Diameter	23	24	25	28 mm	
Pack qty. approx.	150	130	115	95	
10 packs	£27·00	23·50	27·00	27·00	cx
Pack	£ 3·00	2·60	3·00	3·00	

TW-650

TUBES, specimen, polythene, with fitted hinged lids. Also suitable for use as small weighing tubes. In packs of 25.

Length	60	75 mm	
Diameter	16	24 mm	
10 packs	£3·80	8·00	cx
Pack	£0·44	0·90	

TW-660

TUBES, specimen, polypropylene, for the storage or transit of tablets, powders, pastes and small components. Each container comprises a full aperture tube on which the polythene cap, once fitted, is securely held until the tear-tab is pulled and the lower part peeled off. In position the security cap provides a high resistance to loss of gas and vapour from the tube. When the tear-strip is removed the upper half of the cap becomes a push-on lid ideal as a temporary closure. These tubes are not recommended for the transit of liquids. **Without caps.**

Capacity	22	50	135	328 ml	
Height	41	52	75	113 mm	
Cap dia.	26	35	49	62 mm	
Pack qty.	150	100	40	25	
10 packs	£15·00	12·80	14·80	13·60	cx
Pack	£1·65	1·40	1·65	1·50	

ACCESSORIES

TW-664 **Caps,** polythene.

Diameter	26	35	49	62 mm	
Pack quantity	180	120	90	60	
10 packs	£5·40	6·40	7·60	6·80	cx
Pack	£0·60	0·72	0·84	0·76	

SODA-LIME GLASS TUBING

LIGHT WALL

TX-250

TUBING, soda-lime glass, light wall. In lengths of approx. 150 cm.

Ext. dia. mm		Wall mm	Pack qty approx.	10 packs	Pack	
				£	£	
4	±0·15	0·70±0·04	33	**8·60**	**0·95**	*mx*
5			27	**8·60**	**0·95**	*mx*
6			33	**8·60**	**0·95**	*mx*
7			40	**8·60**	**0·95**	*mx*
8			35	**8·60**	**0·95**	*mx*
9			31	**8·60**	**0·95**	*mx*
10	±0·2	0·80±0·04	26	**8·60**	**0·95**	*mx*
11			23	**8·60**	**0·95**	*mx*
12			21	**8·60**	**0·95**	*mx*
13			19	**8·60**	**0·95**	*mx*
14			18	**8·60**	**0·95**	*mx*
15	±0·25	0·80±0·05	17	**8·60**	**0·95**	*mx*
16			16	**8·60**	**0·95**	*mx*
18			14	**8·60**	**0·95**	*mx*
20			12	**8·60**	**0·95**	*mx*
22			11	**8·60**	**0·95**	*mx*
24			10	**8·60**	**0·95**	*mx*
26	±0·5	1·20±0·05	3	**8·60**	**0·95**	*mx*
28			3	**8·60**	**0·95**	*mx*

HEAVY WALL

TX-260

TUBING, soda-lime glass, heavy wall. In lengths of approx. 150 cm.

Ext. dia. mm		Wall mm	Pack qty. approx.	10 packs	Pack	
				£	£	
12·5	±0·5	2·25±0·25	5	**8·60**	**0·95**	*mx*
15·5			4	**8·60**	**0·95**	*mx*

For **borosilicate glass tubing** see overleaf.

CAPILLARY BORE

TX-265

TUBING, soda-lime glass, capillary bore. In lengths of approx. 150 cm.

Ext. dia. mm		Bore mm		Pack qty. approx.	10 packs	Pack	
					£	£	
6·0	±0·25	0·5	±0·1	2	**8·60**	**0·95**	*mx*
6·5		1·1		3	**8·60**	**0·95**	*mx*
6·5		1·8		4	**8·60**	**0·95**	*mx*

GENERAL PROPERTIES OF BOROSILICATE AND SODA-LIME GLASSES

Borosilicate glass has good resistance to thermal shock and can be worked in a blowpipe flame using gas together with compressed air enriched with oxygen. After working it should be annealed in a furnace at 565 to 570°C for 15 minutes then allowed to cool slowly and uniformly no faster than 200°/hour to below 150°C.

Soda-lime glass can be worked in a Bunsen or gas/air burner flame without devitrification. It should be annealed; the technique of cooling in a luminous flame until carbon is deposited is adequate but furnace annealing at 515 to 520°C followed by slow cooling is preferable.

Both types of glasses have excellent chemical resistance, borosilicate being slightly less alkali resistant but more acid resistant than soda-lime glass.

TECHNICAL DATA

TYPICAL CHEMICAL ANALYSIS

Component	Composition	
	Borosilicate	Soda-lime
Silica	80·6%	71%
Boric oxide	12·6%	—
Sodium oxide	4·15%	15%
Aluminium oxide	2·2%	2·2%
Calcium oxide	0·1%	5·7%
Magnesium oxide	0·05%	2·9%
Barium oxide	5 ppm	1·7%
Potassium oxide	—	1·2%

PHYSICAL PROPERTIES

Property	Borosilicate	Soda-lime
Expansion coefficient	$3\cdot3 \times 10^{-6}$ per degC	$9\cdot2 \times 10^{-6}$ per degC
Specific gravity	2·23 gm/cm^3	2·50 gm/cm^3
Refractive index (n_D)	1·475	1·513
Strain point	520°C	475 C
Annealing point	565°C	515°C
Softening point	820°C	710°C

BOROSILICATE GLASS TUBING

LIGHT WALL

TX-280
TUBING, *Pyrex,* **borosilicate glass, light wall.** In standard lengths of 150 cm approx.

Ext. dia. mm	Wall mm	Std. pack qty	Std. pack	Shelf pack qty	Shelf pack
			£		£
4 ±0·4	0·8±0·1	360	17·55	14	0·95
5		260	15·90	12	0·95
6	1±0·1	240	13·85	12	0·95
7		200	13·85	10	0·95
8		180	14·80	9	0·95
9		150	13·85	8	0·95
10		132	10·90	8	0·95
11		120	10·70	8	0·95
12		108	10·75	7	0·95
13		100	10·70	6	0·95
14		76	10·75	5	0·95
15	1·2±0·2	68	10·55	4	0·95
16		64	10·65	4	0·95
17		60	10·70	4	0·95
18		56	10·65	3	0·95
19		52	10·50	3	0·95
20 ±0·5		52	12·05	3	0·95
22		44	11·30	2	0·95
24		40	11·90	2	0·95
26	1·4±0·2	40	12·15	2	0·95
28		32	10·60	2	0·95
30 ±0·8		32	14·15	1	0·95
32		20	9·70	1	0·95
34		20	10·10	1	0·95
36		20	10·60	1	0·95
38		20	11·45	1	0·95
40 ±1·0	1·6±0·2	15	8·80	1	0·95
42		15	11·45	1	0·95
44		15	12·25	1	0·95
46		15	12·80	1	0·95
48		15	13·20	1	0·95
50	1·8±0·2	15	15·25	1	0·95
52		4	4·35	—	—
54		4	4·35	—	—
56		4	4·35	—	—
58		4	6·25	—	—
60 ±1·5	2·2±0·3	4	6·25	—	—
65		4	6·75	—	—
70		4	7·15	—	—
75		4	8·10	—	—
80 ±1·8	2·5±0·3	4	8·65	—	—

MEDIUM WALL

TX-285
TUBING, *Pyrex,* **borosilicate glass, medium wall.** In lengths of 150 cm approx.

Ext. dia. mm	Wall mm	Std. pack qty.	Std. pack	Shelf pack qty.	Shelf pack
			£		£
6 ±0·4	1·5±0·2	150	11·90	9	0·95
7		140	17·75	6	0·95
8		115	17·15	5	0·95
9		100	17·15	4	0·95
10		90	10·30	6	0·95
11		75	9·55	5	0·95
12		70	9·95	5	0·95
13		65	9·95	4	0·95
14		55	9·20	4	0·95
15	1·8±0·2	45	9·20	3	0·95
16		45	9·95	3	0·95
17		40	9·55	3	0·95
18		36	9·20	2	0·95
19		36	9·75	2	0·95
20 ±0·5		32	10·00	2	0·95
22		32	11·15	2	0·95
24		28	10·75	2	0·95
26	2·0±0·2	20	9·55	2	0·95

CAPILLARY BORE

TX-290
TUBING, *Pyrex,* **borosilicate glass, capillary bore.** In lengths of 150 cm approx.

Ext. dia. mm	Bore mm	Std. pack qty.	Std. pack	Shelf pack qty.	Shelf pack
			£		£
5 ±0·8	0·5 ±0·25	120	12·25	7	0·95
6	0·75	85	13·05	5	0·95
7	1·0	65	13·05	4	0·95
7	1·6 ±0·4	65	13·05	4	0·95
7	2·5	65	11·65	4	0·95
8	2·0	50	13·05	3	0·95
9	3·0	40	12·25	2	0·95

GLASS TUBING ACCESSORIES

GJ-150	**Tubing gauge**
GP-175 to GP-190	**Cutting tools**
GP-300	**Safety grip**

For full details and prices see entries in List No. sequence.

All items on this page are coded *jx*

FLEXIBLE TUBINGS

GENERAL PROPERTIES OF COMMON ELASTOMERIC MATERIALS

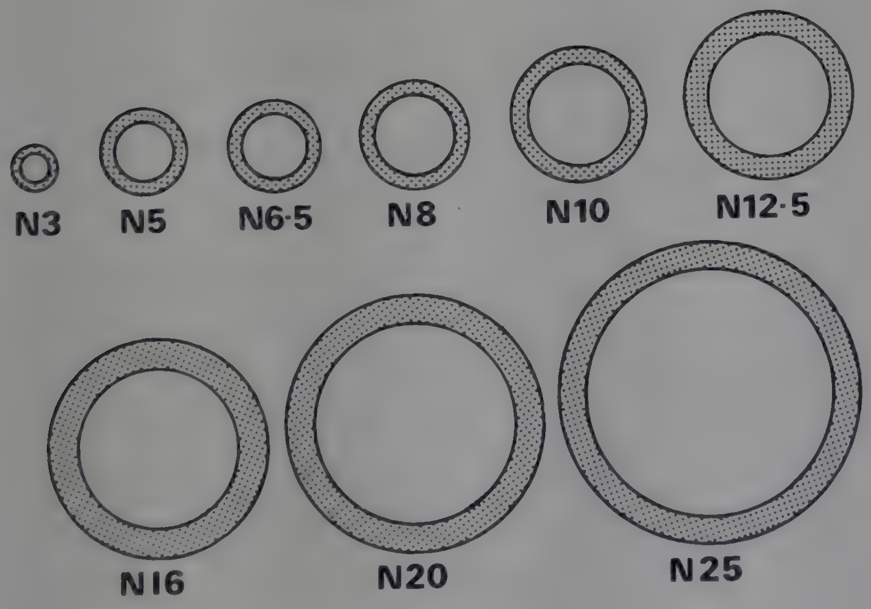
The table below is of a general nature: the properties of certain individual formulations may differ from those shown

Type of elastomer	Appearance and notable features	Maximum service temperature °C approx.	Sterilisation		Attacking reagents	
			Air at 160°C	Steam at 121°C	Acids and alkalis	Common organic solvents
Butyl rubber (isobutylene-isoprene)	Filled and pigmented. Very low gas permeability	110	No	No	None	Esters, chlorinated hydrocarbons
Natural rubber (natural polyisoprene)	Translucent (latex) or filled and pigmented	70	No	Some grades	Conc. oxidising acids	Aliphatic, aromatic and chlorinated hydrocarbons, esters, ketones and ethers
Neoprene (polychloroprene)	Filled and pigmented	120	No	No	Conc. oxidising acids	Aromatic and chlorinated hydrocarbons, esters and ketones
Nitrile rubber (styrene acrylonitrile)	Filled and pigmented	130	No	Yes	Conc. oxidising acids	Chlorinated hydrocarbons, esters and ketones
PVC (plasticised vinyl)	Transparent or pigmented. Low gas permability	50	No	Some grades	None	Ketones, cyclic ethers, esters and chlorinated hydrocarbons
Silicone rubber	Translucent. Very flexible	250	Yes	Yes	Strong alkalis	Esters

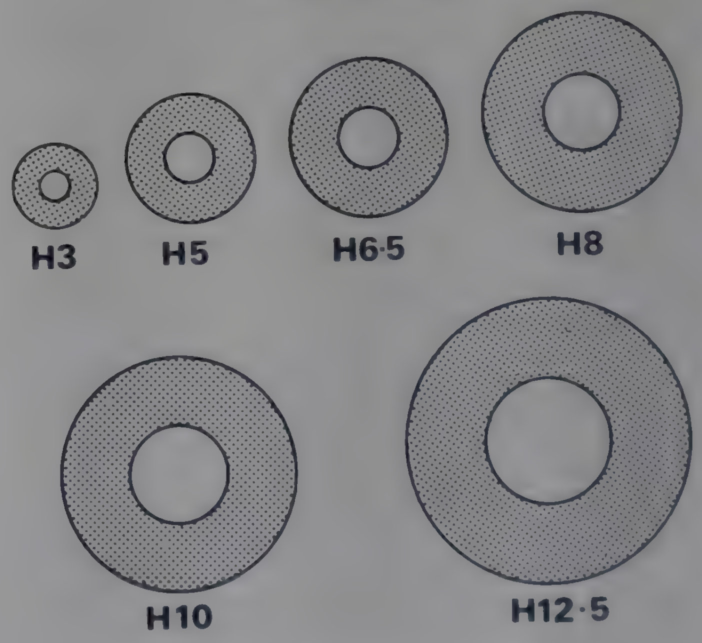
SIZE DESIGNATIONS

The illustrations below are approximately full size corresponding to the normal wall (N) and heavy wall (H) size designations given in BS 2775. Wherever possible the tubings listed on the following pages conform to these designations.

NORMAL WALL



HEAVY WALL



COLOUR CODING

With the exception of TX-625 and TX-770 the flexible tubings listed on the following pages are coloured as follows.

Butyl rubber	Black
Natural rubber (latex)	Translucent amber
Natural rubber (filled)	Red
Neoprene	Grey
PVC	Transparent colourless
Silicone	Translucent-opalescent

APPLICATIONS GUIDE

Compressed air	TX-625, TX-778
Gas analysers	TX-500, TX-770
Coal gas	TX-520, TX-635, TX-780
LPG and natural gases	TX-500
Inert gases (from pressure regulated cylinders)	TX-625, TX-778
Peristaltic pumps	TX-805
Vacuum, high	TX-755
low	TX-525, TX-772, TX-778
Water, mains pressure	TX-625, TX-778
low pressure	TX-525, TX-755, TX-772

FLEXIBLE TUBINGS

(continued)

BUTYL RUBBER

TX-500

TUBING, butyl rubber, black. A low gas permeability tubing particularly suitable for gas analyses where changes in gas composition due to diffusion through the tubing are to be minimal. Also suitable for use with natural gas (methane). To BS 2775. Coil of 20 metres.

Designations	—	N3	N5	N6·5	N8	
Int. dia.	1·5	3	5	6·5	8 mm	
Wall	0·5	0·75	1·5	1·5	2 mm	
Coil	**£1·20**	**1·30**	**2·00**	**2·30**	**2·75**	*cx*
Metre	**£0·14**	**0·15**	**0·19**	**0·21**	**0·23**	

NATURAL RUBBER

TX-520

TUBING, natural rubber, red, **normal wall,** to BS 2775. Coil of 20 metres.

Designation	N3	N5	N6·5	N8	N10	
Int. dia.	3	5	6·5	8	10 mm	
Wall	0·75	1·5	1·5	2	2 mm	
Coil	**£1·30**	**1·85**	**2·00**	**3·50**	**3·80**	*cx*
Metre	**£0·15**	**0·19**	**0·20**	**0·28**	**0·29**	

Designation	N12·5	N16	N20	N25	
Int. dia.	12·5	16	20	25 mm	
Wall	2·25	3·25	3·25	3·25 mm	
Coil	**£5·00**	**7·50**	**13·80**	**22·00**	*cx*
Metre	**£0·35**	**0·52**	**0·88**	**1·37**	

TX-525

TUBING, natural rubber, red, **heavy wall,** to BS 2775. Coil of 20 metres.

Designation	H3	H5	H6·5	H8	H10	H12·5	
Int. dia.	3	5	6·5	8	10	12·5 mm	
Wall	3	4	5	6	7	8·5 mm	
Coil	**£2·75**	**4·80**	**6·60**	**9·40**	**12·80**	**22·00**	*cx*
Metre	**£0·23**	**0·34**	**0·44**	**0·59**	**0·81**	**1·37**	

TX-600

TUBING, natural rubber, (latex) translucent amber, **normal wall,** extremely elastic with very smooth bore. Sulphur free, has good ageing properties and can be repeatedly sterilised at 121°C. To BS 2775. Coil of 20 metres

Designation	N3	N5	N6·5	N8	N10	
Int. dia.	3	5	6·5	8	10 mm	
Wall	0·75	1·5	1·5	2	2 mm	
Coil	**£6·40**	**8·00**	**8·00**	**13·00**	**12·00**	*cx*
Metre	**£0·42**	**0·51**	**0·51**	**0·81**	**0·74**	

TX-625

TUBING, natural rubber, thick wall, reinforced with canvas, to BS 924 Part 1. Suitable for working pressures up to 150 lbf/in² (10·5 kgf/cm²). Coil of 18 metres.

Int. dia. nominal	6	10	13	16 mm	
Int. dia.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$ in	
Ext. dia.	$\frac{19}{32}$	$\frac{23}{32}$	$\frac{7}{8}$	$1\frac{1}{16}$ in	
No. of plies	3	3	4	5	
Coil	**£12·20**	**14·40**	**21·00**	**28·00**	*cx*
Metre	**£0·88**	**0·90**	**1·45**	**1·90**	

TX-635

GAS BURNER TUBES, natural rubber red, with reinforced ends for fitting to Bunsen burner and gas tap tubulures. External diameter 8·5 mm, length 60 cm.

Ten **£4·70** Each **£0·52** *cx*

NEOPRENE

TX-750

TUBING, neoprene, grey, **normal wall.** Free from sulphur. To BS 2775. Coil of 20 metres.

Designation	N5	N6·5	N8	N10	N12·5	
Int. dia.	5	6·5	8	10	12·5 mm	
Wall	1·5	1·5	2	2	2·25 mm	
Coil	**£2·50**	**2·90**	**4·20**	**5·00**	**6·80**	*cx*
Metre	**£0·22**	**0·24**	**0·31**	**0·35**	**0·45**	

TX-755

TUBING, neoprene, grey, **heavy wall.** Free from sulphur. To BS 2775.

Designation	H3	H5	H6·5	H8	H10	H12·5	
Int. dia.	3	5	6·5	8	10	12·5 mm	
Wall	3	4	5	6	7	8·5 mm	
Coil length	20	20	20	20	20	10 metres	
Coil	**£4·10**	**7·20**	**10·40**	**14·80**	**21·00**	**22·00**	*cx*
Metre	**£0·31**	**0·47**	**0·65**	**0·92**	**1·32**	**2·70**	

PVC (VINYL)

TX-770

TUBING, PVC, opaque green. With smooth internal bore and low gas permeability making it especially suitable for use where contamination cannot be tolerated as in blood gas determinations, etc. Recommended for use with Van Slyke's apparatus. Internal diameter 6·35 mm, wall thickness 3·2 mm. Coil of 30 metres.

Coil **£11·00** Metre **£0·55** *cx*

TX-772

TUBING, PVC, colourless, transparent, non-toxic and of great durability. Can be steam sterilized at 125°C. Suitable for medical and biological applications. To BS 2775.

Designation	N3	N5	N6·5	N8	
Int. dia.	3	5	6·5	8 mm	
Wall	0·75	1·5	1·5	2 mm	
Coil length	30	30	30	30 metres	
Coil	**£0·70**	**2·00**	**2·20**	**3·90**	*cx*
Metre	**£0·14**	**0·15**	**0·17**	**0·23**	

Designation	N10	N12·5	N16	
Int. dia.	10	12·5	16 mm	
Wall	2	2·25	3·25 mm	
Coil length	30	10	10 metres	
Coil	**£4·80**	**2·40**	**3·50**	*cx*
Metre	**£0·25**	**0·33**	**0·45**	

For properties of elastomers and recommendations of tubings for particular uses see page 699.

FLEXIBLE TUBINGS

PVC (VINYL)

continued

TX-774

TUBING, PVC, colourless, transparent. Slightly less elastic than TX-772,

Int. dia.	6	8	10	12	18	25 mm	
Wall	1	1·5	2	2	2·5	3 mm	
Coil length	30	30	30	10	10	10 metres	
Coil	**£1·75**	**2·15**	**2·95**	**1·40**	**2·40**	**3·60**	*cx*
Metre	**£0·15**	**0·17**	**0·20**	**0·23**	**0·34**	**0·46**	

TX-778

TUBING, PVC, colourless, transparent with terylene mesh reinforced wall. A flexible tubing of great inherent strength. Suitable for moderate pressure or vacuum applications.

Int. dia.	5	6·5	8	10 mm	
Wall	2·5	3	3	3 mm	
Coil length	30	30	30	30 metres	
Coil	**£5·50**	**7·60**	**8·20**	**10·80**	*cx*
Metre	**£0·29**	**0·36**	**0·39**	**0·47**	

Int. dia.	13	16	19 mm	
Wall	3	3·5	3·5 mm	
Coil length	10	10	10 metres	
Coil	**£4·40**	**6·40**	**7·80**	*cx*
Metre	**£0·54**	**0·79**	**0·95**	

TX-780

TUBING, PVC, with wall reinforced with steel wire spiral. This tubing is very flexible, is crush resistant and will not kink, thus reducing hazards. Suitable for large gas burners and larger pieces of gas operated equipment. Approx. 7 mm bore. Requires end connectors TX-782.

Coil of 10 metres ... Coil **£2·50** Metre **£0·34** *cx*

ACCESSORY

TX-782 **End connectors,** neoprene, fluted internally one end for gas tight connection to tubing TX-780.

Ten pairs **£1·65** Pair **£0·23** *cx*

SILICONE RUBBER

TX-805

TUBING, silicone rubber, translucent, non-toxic, extremely elastic. Suitable for use in peristaltic pumps. Will withstand storage in tropical conditions and repeated sterilisation in steam at 121°C or air at 160°C. Wall thickness 1·6 mm. Coil of 10 metres.

Int. dia. nominal	0·6	1	1·5	2 mm	
Coil	**£2·50**	**2·60**	**3·20**	**3·40**	*cx*
Metre	**£0·34**	**0·35**	**0·42**	**0·44**	

Int. dia. nominal	3	4	6	8 mm	
Coil	**£4·20**	**4·80**	**5·60**	**9·60**	*cx*
Metre	**£0·52**	**0·58**	**0·68**	**1·16**	

OTHER PLASTICS TUBINGS

TX-825

TUBING, acrylic, transparent, seamless. In lengths of 2 metres

Ext. dia.	6·5	12	25	50 mm	
Int. dia.	4·5	8	19	44 mm	
Per length	**£0·70**	**1·10**	**1·85**	**4·50**	*mx*

AE-200

ADHESIVE suitable for above tubing. For details and price see entry in List No. sequence.

TX-835

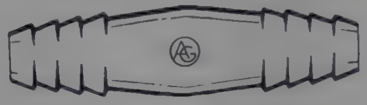
TUBING, polythene, natural grade, medium wall. A tough flexible but inelastic tubing. In coil of 30 metres.

Int. dia.	1·5	3·0	4·5	6·3	8·0	12·5 mm	
Wall	1·5	1·5	1·5	1·5	1·5	2·0 mm	
Coil	**£0·70**	**0·80**	**1·10**	**1·30**	**1·50**	**3·70**	*cx*
Metre	**£0·14**	**0·14**	**0·14**	**0·14**	**0·14**	**0·22**	

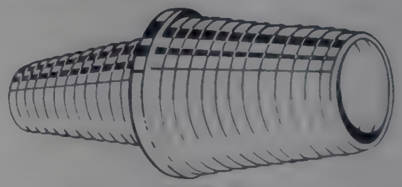
PP-780

WELDING TORCH, for welding polythene, PVC or other thermoplastics. The torch operates on bottled butane or propane gas and the combustion gases serve as the heat vehicle for welding. For full details and price see entry in List No. sequence.

TUBING CONNECTORS



TX-850



TX-854

TX-850

TUBING CONNECTOR, Ⓐ, glass, for joining two pieces of flexible tubing. Comprises a length of glass tubing with tapered corrugations at each end to accept 5 to 12 mm bore tubings. Overall length 6·5 cm.

Ten **£1·85** Each **£0·25** *ax*

TX-854

TUBING CONNECTORS, polypropylene, with corrugated conical ends to accept flexible tubing.

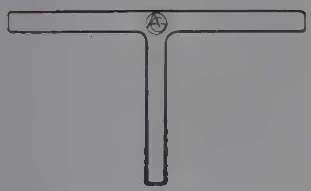
Minimum outside		Minimum inside dia. mm	Length mm	Ten	Each	
Large end mm	Small end mm					
				£	**£**	
7	4	3	53	**1·30**	**0·20**	*mx*
9	4	3	62	**1·45**	**0·22**	*mx*
10	7	5	62	**1·90**	**0·25**	*mx*
13	10	8	66	**2·10**	**0·28**	*mx*
19	13	11	75	**2·90**	**0·35**	*mx*

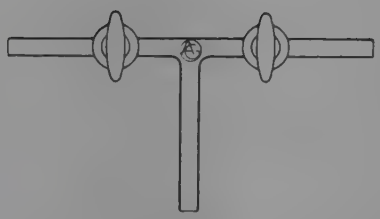
TUBING CONNECTORS
(continued)

TX-858

TX-858
TUBING CONNECTORS, push-fit, polythene, for joining flexible tubing. One piece of tubing is fitted to each half of the connector and the two halves can then easily be joined or separated.

Int. dia. of tubing	7 to 9	10 to 16 mm	
Ten	£1·60	2·40	cx
Each	£0·23	0·31	


TX-860


TX-870

TX-860
T-TUBES, (AG), glass.

Limb length	40	50	70 mm	
Ext. dia.	5	7	10 mm	
Ten	£0·72	0·76	0·98	ax
Each	£0·15	0·15	0·17	

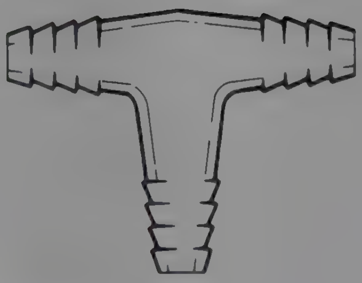
TX-865
T-TUBES, polypropylene, corrugated for connecting flexible tubing.

Length	27	36	40 mm	
For tubing bores	5 to 7	7·5 to 8	10 to 12·5 mm	
Ten	£1·00	1·10	1·45	mx
Each	£0·17	0·18	0·22	

TX-870
T-TUBES, (AG), glass, with two stopcocks.

Limb length	60	70 mm	
Ext. dia.	5	7 mm	
Ten	£12·00	14·00	ax
Each	£1·35	1·55	

TX-865


TX-875

TX-875
T-TUBE, (AG), glass with corrugated nipple ends to accept tubing from 5-12 mm bore.
Ten £3·20 Each £0·38 ax

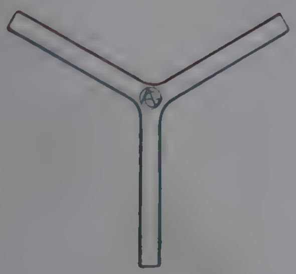
TX-880
Y-TUBES, (AG), glass.

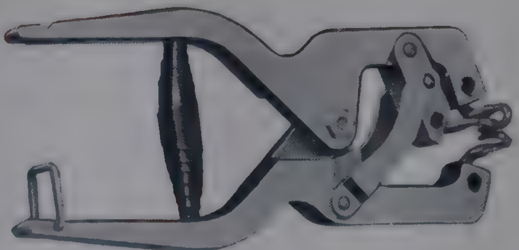
Limb length	40	50	70 mm	
Ext. dia.	5	7	10 mm	
Ten	£0·90	0·98	1·30	ax
Each	£0·16	0·17	0·20	

TUBING AND HOSE CLIPS see CP-220 to CP-285 in List No. sequence.

TUBING EXPANDER

This useful tool provides a ready means of expanding the ends of rubber or plastics tubing and fitting them on to glass tubing or nipple connectors without any risk of damage to the glassware. The three jaws of the pliers are fitted with bent needles, the ends of which are inserted into the tubing. On squeezing the handles, the three needles move apart concentrically and the tubing is stretched. It can then be placed over the glass connection and the tool withdrawn.


TX-880


TX-910

TX-910
TUBING EXPANDER, large size for tubing of minimum 4 mm bore, maximum opening 22 mm.
Each £3·63 fx

TX-911 Needles, set of 3 for replacement ... Set £1·00 fx

ULTRASONIC CLEANING

- **Stainless steel bath 45 cm deep for total immersion of most pipettes**
- **Harmless to most intricate mechanisms or delicate apparatus**
- **Requires no skill in operation**
- **Built-in heater and thermostat, temperature range ambient to 95°C**
- **Fitted draincock for emptying**

Description of UL-150

The ultrasonic cleaner comprises a generator and a cleaning bath. The generator is a solid state power oscillator which is air cooled by an integral fan. Power from the generator is led to the bath by means of a cable and socket.

The bath has a stainless steel liner and is fitted with an immersion heater and hydraulic thermostat. A cock on the side enables the contents of the bath to be drained.

Cleaning Solutions

For general purposes a solution made from cleaning powder UL-1 6 provides powerful cleansing without foaming. The powder, which incorporates a rinse aid, is packed in single charge quantities each of which makes 15 litres of solution.

Where the removal of a specific contaminant is required for which the cleaning powder solution is inadequate the tank should be filled with a suitable solvent. In each case the ultrasonic cleaner accelerates particle detachment and effects cleaning in the minimum of time.

Technical Data

Bath

Internal dimensions	25×16×45 cm deep
Overall dimensions	39×33×60 cm high
Capacity, approx.	15 litres
Heater power rating	1 kW
Thermostat range	ambient to 95°C
Weight, net	19 kg

Generator

Power rating, approx.	375W
Output frequency	25 ±3 kHz
Modulating frequency	100 Hz
Output power, mean	200W
Overall dimensions	44×17×25 cm high

UL-150

ULTRASONIC CLEANER, as specification, with generator and 15 litre stainless steel lined cleaning bath fitted with 1 kW heater, thermostat and drain cock.

For 220/240V 50/60 Hz single phase supplies. Each **£395·00** *gx*

For 110/120V 50/60 Hz single phase supplies. Each **£425·00** *gxN*

ACCESSORIES

UL-154	**Lid,** stainless steel		Each	**£4·00**	*fx*
UL-156	**Cleaning powder.** In pack sufficient to make 15 litres of solution	20 packs **£9·00**	Pack	**£0·52**	*cx*
CM-742	**Cleanser,** *By-Prox*, a liquid detergent equally effective in hard, soft and salt water	For details and prices see entries in List No. sequence.			
CM-754	**Cleanser,** *Decon* 90, a general purpose surfactant				

For efficient, high-speed cleaning of instruments, components and laboratory glassware including pipettes, burettes, flasks, separating funnels and other items which are difficult to clean by traditional methods.

Principle of Ultrasonic Cleaning

Electrical energy generated at high frequency is fed to a transducer in which it is converted into mechanical vibrations. The transducer is fitted to the base of the cleaning bath which is partially filled with liquid, and the vibrations produce a phenomenon known as cavitation which is the continual formation and disappearance of minute cavities throughout the liquid. The local forces produced at each cavity are very large and result in a rapid cleaning action on the surfaces of objects immersed in the liquid. The cavitation forces in the bath produce a certain amount of unavoidable audible harmonic resonance.

UL-150

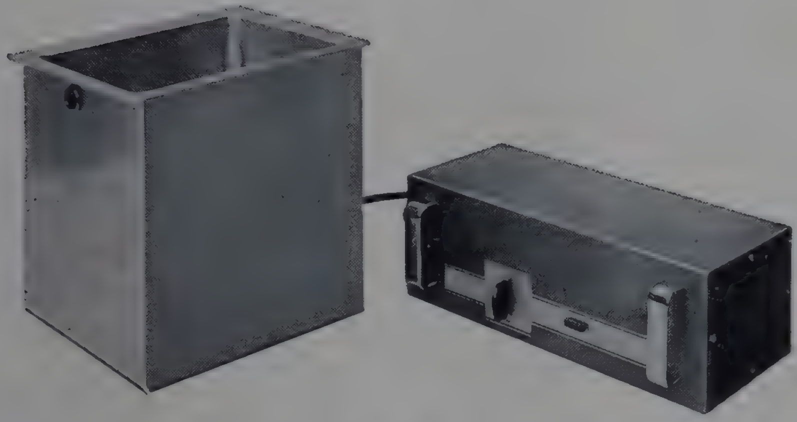
CLEANING MATERIALS AND WASHING EQUIPMENT

Other items for cleaning and washing are listed elsewhere in this catalogue as below:

Cloths	**see CM-510 to CM-560**
Chamois leather	**see CM-590**
Sponges	**see CM-620**
Tissues	**see CM-650 to CM-662**
Polishes	**see CM-760 to CM-775**
Bottle washers	**see WD-020 and WD-050**
Pipette washers	**see WD-120**

ULTRASONIC CLEANING

UL-170



UL-180

The general purpose ultrasonic kits listed below are suitable for cleaning mechanisms, electrical components, small pieces of glass apparatus and medical instruments, etc.

Each kit comprises a generator and a stainless steel bath. The generator develops power at frequencies above the audible limit, pulsed at mains frequency, and the signal is transmitted to a transducer bonded to the base of the bath. Some unavoidable audible harmonic resonance is produced.

The generator requires no warm-up time and tunes automatically to take account of liquid level, cleaning load and input voltage.

The bath is suitable for liquid temperatures up to approximately 150°C. However, some hot solutions can damage the bath and the manufacturer's instructions must be followed with regard to the use of hot cleaning solutions.

UL-170

ULTRASONIC CLEANING KIT, comprising a 2 litre capacity cleaning bath, 100W mean output 40 kHz generator, coaxial connector and instructions manual.

Bath dimensions, internal	15·5×11×12·5 cm high
Bath dimensions, external	19·5×14×21 cm high
Generator dimensions	30·5×18×16 cm high

For 220/240V 50/60 Hz single phase supplies.
Each **£98·00** *fx*

For 110/120V 50/60 Hz single phase supplies.
Each **£113·00** *fxN*

ACCESSORY

UL-172 **Lid,** stainless steel ... ... Each **£2·00** *fx*

UL-180

ULTRASONIC CLEANING KIT, comprising 5 litre capacity cleaning bath, 200W mean output 40kHz generator coaxial connector and instructions manual.

Bath dimensions, internal	25 ×16×15 cm deep
Bath dimensions, external	28 ×19×25 cm high
Generator dimensions	30·5×18×16 cm high

For 220/240V 50/60 Hz single phase supplies.
Each **£178·00** *fxN*

For 110/120V 50/60 Hz single phase supplies.
Each **£193·00** *fxN*

ACCESSORY

UL-154 **Lid,** stainless steel. For price see entry in List No. sequence.

Suitable cleaning solutions
—general purpose use CM-742
—special purpose use CM-754
For details see entries in List No. sequence.

VACUUM APPARATUS INDEX

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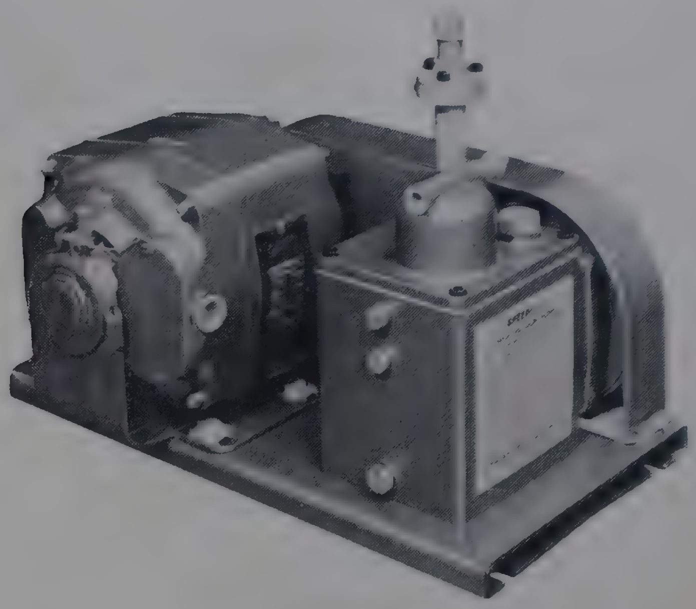
ROTARY VACUUM PUMPS


VB-042

VB-090

OIL NON-RETURN VALVE
All pumps, **except VB-042,** are fitted with a patented anti-suckback valve which prevents oil flooding the pipeline system should the electrical power to the motor fail.

GAS BALLAST
All pumps, **except VB-042,** are fitted with a gas ballast facility which enables most condensable vapours to be pumped directly without significant oil contamination.

INLET FILTER
The gas ballast control valve includes a filter which prevents dirt entering the pump and silences the ballast air hiss.

BAFFLE SYSTEM
An effective baffle prevents oil spray discharge. For complete elimination of oil mist, filter VB-175 is available.

TWO STAGE PUMPS
Two stage pumps should be used where vacua below 0·01 torr are required while using full gas ballast or where the rotary pump is required to back a vapour diffusion pump.

PRESSURE DUTY
VB-042 and VB-104 can be used as compressors.

PUMP DATA

List No.	Model No.	No. of stages	Ultimate vacuum, torr		Approx. water vapour pumping rate g/hour	Displacement l/min	Oil capacity litres	Vacuum connection o.d. mm
			Without gas ballast	With gas ballast				
VB-042	ISP 30C	1	0·1	Not fitted	Nil	30	1	16
VB-090	ED M2	2	0·0007	0·05	40	30	1	22
VB-104	ES 50	1	0·01	0·5	70	50	0·45	16
VB-114	ED 50	2	0·0005	0·01	100	50	0·75	16
VB-126	ES 100	1	0·005	0·5	90	100	1·2	28
VB-136	ED 100	2	0·0002	0·005	150	100	2·0	28
VB-146	ES 200	1	0·005	0·3	190	190	1·7	28
VB-156	ED 200	2	0·0001	0·001	170	190	1·85	28

ROTARY VACUUM PUMPS

VB-042

VACUUM PUMP, *Edwards* **ISP 30C,** construction and performance as specified, with motor for 220/240V 50 Hz single phase supplies, initial charge of oil and instructions. Can be used as a compressor giving up to 0·7 kgf/cm². **Does not include integral anti-suckback valve or gas ballast** ... ... Each **£60·70** *fx*

REPLACEMENT PARTS

VB-047	**Vee-belt**	Each	**£0·49**	*fx*
LX-140	**Pump oil.** For price see entry in List No. sequence.			

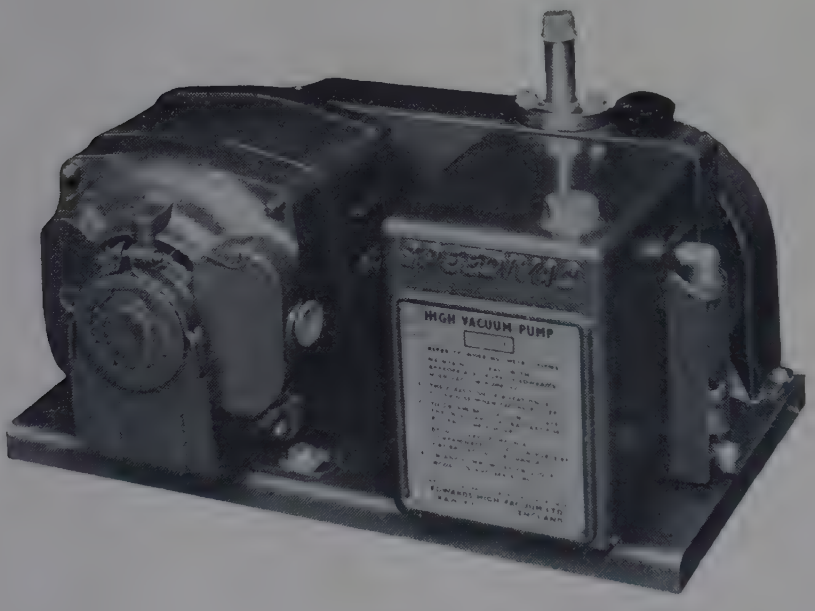
ACCESSORIES

VB-061	**Anti-vibration mountings**	Set	**£4·62**	*fx*
VB-068	**Moisture trap,** with desiccant tray, for direct mounting on pump	Each	**£17·45**	*fx*

VB-090

VACUUM PUMP, *Edwards* **EDM2,** construction and performance as specified, with direct-drive motor for 220/240V 50 Hz single phase supplies, initial charge of oil and instructions ... ... Each **£84·00** *fx*

Flexible tubing see TX-755 and TX-778
Pump oil see LX-140
For details and prices see entries in List No. sequence



VB-114

VB-118

VB-119

VB-104

VACUUM PUMP, *Edwards* **ES 50,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions. Each **£81·60** *fx*

VB-114

VACUUM PUMP, *Edwards* **ED 50,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions. Each **£113·50** *fx*

REPLACEMENT PART

VB-116	**Vee-belt,** for VB-104 and VB-114 ...	Each	**£0·56**	*fx*

ACCESSORIES

VB-118	**Adapter,** metal, to connect 6·5 or 8 mm rubber vacuum tubing to VB-104 or VB-114	Each	**£1·05**	*bx*
VB-119	**Cone,** borosilicate glass, 19/26, to connect an all-glass system to VB-104 or VB-114	Each	**£0·80**	*ax*
VB-121	**Anti-vibration mountings,** for VB-104.	Set	**£4·62**	*fx*
VB-122	**Anti-vibration mountings,** for VB-114.	Set	**£4·62**	*fx*
VB-068	**Moisture trap,** with desiccant tray. For price see entry in List No. sequence.			
VB-123	**Adapter,** connecting VB-104 or VB-114 to trap VB-068.	Each	**£3·92**	*fx*

VB-126

VACUUM PUMP, *Edwards* **ES 100,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions. Each **£110·00** *fxN*

VB-136

VACUUM PUMP, *Edwards* **ED 100,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions. Each **£150·00** *fxN*

ACCESSORY

VB-138	**Anti-vibration mountings,** for VB-126 and VB-136.	Set	**£4·62**	*fxN*

VB-146

VACUUM PUMP, *Edwards* **ES 200,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions. Each **£149·00** *fxN*

ACCESSORY

VB-148	**Anti-vibration mountings,** for VB-146.	Set	**£4·62**	*fxN*

VB-156

VACUUM PUMP, *Edwards* **ED 200,** construction and performance as specified, with motor for 220/240V a.c. supplies, initial charge of oil and instructions. Each **£205·00** *fxN*

ACCESSORY

VB-159	**Anti-vibration mountings,** for VB-156.	Set	**£4·62**	*fxN*

VB-175

OIL MIST FILTER, *Edwards* **OMF200,** for use with vacuum pumps, up to 200 l/min displacement. Reduces the air pollution by separating and trapping oil mist from the discharge of any oil sealed rotary pump, and is particularly valuable where the outlet has to be indoors. such as with trolley mounted pumps ... Each **£23·40** *fxN*

Gallenkamp VACUUM PUMP TROLLEY

Trolley: tubular frame, stove enamelled, on castors with shelf 56 × 43 cm and fitted with two vapour traps, *Vacustat* gauge range 10 to 10^{-2} torr and manifold,

Vapour trap: borosilicate glass Dewar vessel with drain tube connected to a 100 ml receiving flask. The simple design provides adequate thermal insulation of the freezing mixture and a large condensing surface for contaminating vapours. In use the trap is filled with acetone or alcohol and a few lumps of solid carbon dioxide added. The receiving flask is detached to remove condensate.

Manifold: all metal with heavy wall tubing connections to the vapour traps. Two diaphragm control valves are provided.

Oil trap: this accessory VB-484 is recommended for use with pumps which do not have an anti-suckback valve. The trap, when fitted to the pump inlet, will prevent oil flooding the system should the pump be switched off before the vacuum is broken.

Overall dimensions	H W D
	80 × 60 × 45 cm

VB-480

VACUUM TROLLEY, *Gallenkamp*, as specification, supplied with *Vacustat*, two vapour traps with receiving flasks and two diaphragm control valves. **Without vacuum pump** ... ... Each **£106·00** *bx*

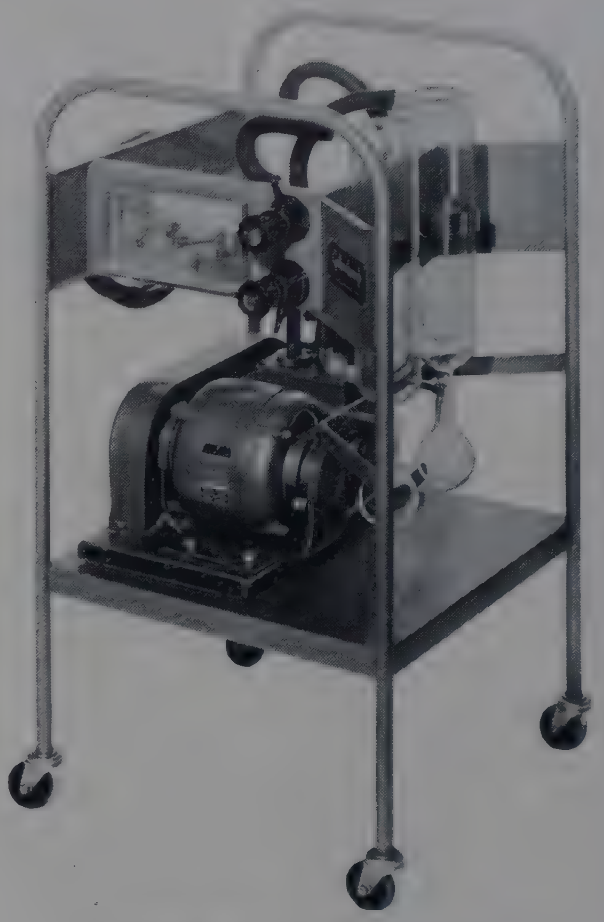
ACCESSORIES

VB-484	**Oil trap,** 1000 ml, borosilicate glass, with 16 mm plain tubing connector for pump inlet ...	Each **£2·90** *ax*
VB-118	**Adapter,** to connect pumps VB-104 and VB-114 to trolley manifold ...	For details and prices see entries in List No. sequence.
TX-755	**Tubing,** neoprene, heavy wall ...	
TX-778	**Tubing,** PVC, reinforced wall ...	
MF-932	**Mercury,** for *Vacustat*, approx. 150 g required	
VB-042 **VB-104** **VB-114**	Vacuum pumps	

REPLACEMENT PARTS

VB-486	**Vapour trap,** borosilicate glass, Dewar type with 19/26 cone, **without receiving flask** ...	Each **£7·00** *ax*
VB-488	**Receiving flask,** spherical with 19/26 socket, **for use with VB-486**	Each **£1·15** *ax*

- **Suitable for vacua down to about 5 × 10^{-2} torr**
- **Fitted with vapour traps *Vacustat* gauge, manifold and control valves**



VB-480 with vacuum pump

VACUUM PUMP TROLLEY

- **Attractively styled in natural beechwood**
- **Includes manifold, diaphragm valves and vacuum gauge**
- **Fitted with stowage hooks and grommet for mains cable**
- **Runs on easy-glide castors fitted with brakes**

For details see FX-575 in List No. sequence.

FX-575

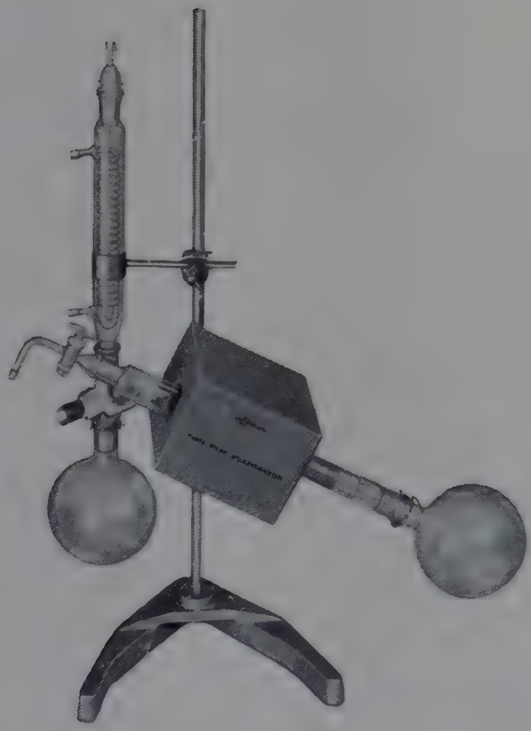
VACUUM OVEN

Gallenkamp VACUUM OVENS

Regd trade mark

- Maximum temperature 150°C
- Temperature control within 0·5degC
- Two sizes available
- Vacuum range 0 to 760 torr
- Integral vacuum gauge

For details and prices see OV-930 in List No. sequence.

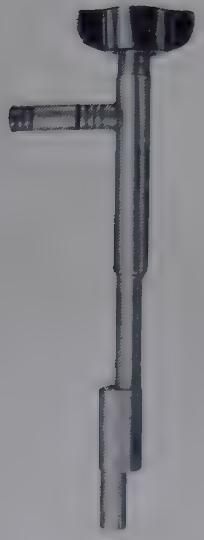


Gallenkamp ROTARY EVAPORATOR

Regd trade mark

- Rapidly removes solvents from solutions when vacuum and gentle heating are applied
- Especially useful with heat-sensitive materials
- Rapid distillation occurs at temperatures well below normal boiling points
- Suitable for batch and semi-continuous operation

For details and prices see EU-100 et seq in List No. sequence.

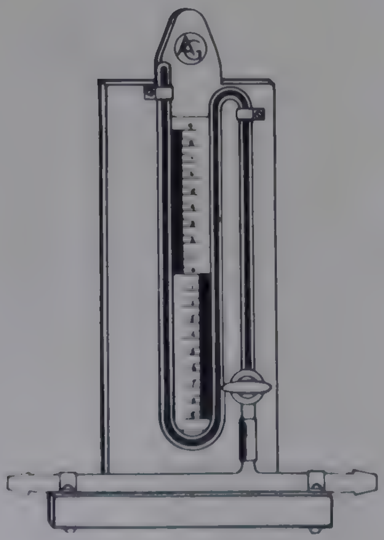


Gallenkamp FILTER PUMPS

Regd trade mark

- Metal construction
- Operating vacuum about 200 torr
- High efficiency model requires minimum throughput of water

For details and prices see FD-210 and FD-215 in List No. sequence.



AG VACUUM MANOMETERS

Regd.

- Anschutz pattern
- Graduated 10—0—10 cm

For details and prices see MB-050 and MB-060 in List No. sequence.

VAPOUR DIFFUSION PUMP

Enables pressures lower than those given by the two-stage mechanical pump to be attained. In addition, the vapour pump gives high pumping rates and flow rates, at pressures near the ultimate of the mechanical pump. Where time is an important factor, it may be profitable to use a vapour pump to speed operations although the ultimate pressure required is within the capacity of a mechanical pump.

VB-500

TECHNICAL DATA

Ultimate vacuum	10^{-7} torr
Speed, unbaffled	10 litres/sec
baffled	5–6 litres/sec
Backing pressure	4 torr
Heater loading	350W
Cooling water flow	0·5 litres/min minimum at 15°C

VB-500
VAPOUR DIFFUSION PUMP, mercury, *Edwards* **EMI,** as specification. For 100/125, 200/225 or 230/250V supplies. Requires but does not include 30 ml (410 g) of mercury ... ... Each **£59·55** *fxN*

When ordering please state voltage to the nearest 10V.

ACCESSORIES

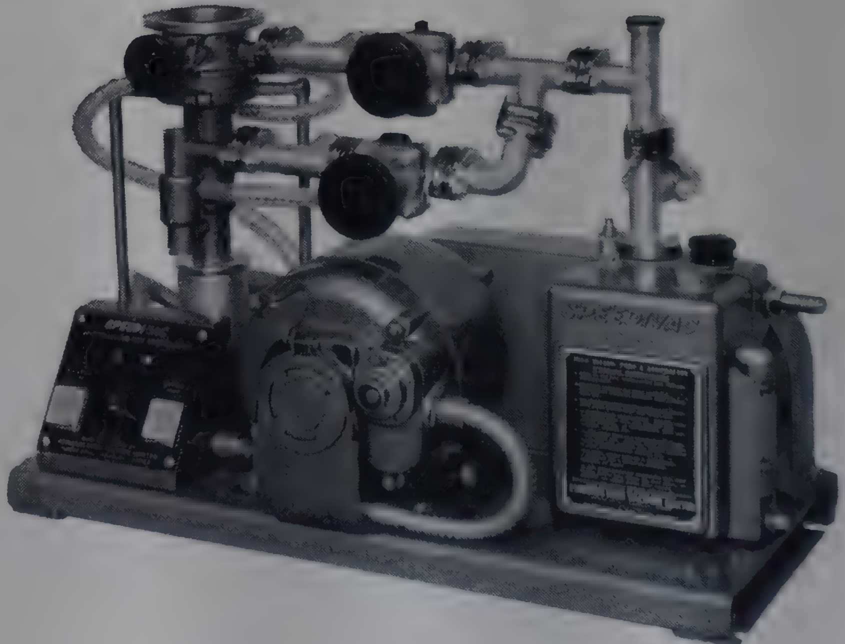
MF-932	**Mercury,** triple distilled	For full details and prices see entries in List No. sequence.
VB-104	**Backing pump** ...	
VB-584	**Vapour trap,** liquid nitrogen cooled for fitting directly to VB-500 ... ... Each **£52·50** *fxN*	

COMBINATION VAPOUR DIFFUSION AND ROTARY VACUUM PUMP

Comprises a gas ballasted rotary pump connected to a stainless steel water cooled oil diffusion pump to give a combined pumping speed of 6 litres/sec and an ultimate vacuum of 10^{-5} torr. A minimum cooling water flow of 300 ml/min at 15°C is necessary. Manually operated backing, roughing and air admittance valves, a thermal overload switch and on/off switches for the pumps are provided. A baffle valve, which enables the operator to isolate the pump and admit air to the system without switching off the pumps, is mounted on the diffusion pump. Provision is made for fitting a Pirani gauge head VC-094.

VB-680
COMBINATION PUMP, *Edwards,* **10^{-5} torr,** as specification, comprising rotary and diffusion pumps and baffle valve mounted on a baseplate, and an initial supply of oil for both pumps. For 230/240V 50 Hz single phase supplies ... ... Each **£238·50** *fxN*

ACCESSORY
VC-094 **Gauge head.** For details see entry in List No. sequence.



VB-680

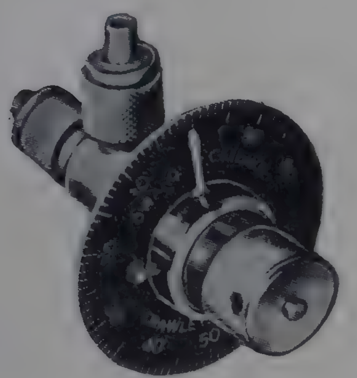
OTHER VACUUM APPARATUS

Desiccators	see	DK-465 et seq.
Drying apparatus	see	DK-720 et seq.
Embedding baths	see	HJ-230 et seq.
Evaporator	see	EU-100
Manometers	see	MB-050 et seq.
Ovens	see	MV-600 and OV-930
Taps	see	FY-741 et seq.
Stopcocks	see	ST-800 et seq.
Tubing	see	TX-755 and TX-778

VACUUM VALVE

VB-770
NEEDLE VALVE, vacuum sealed, *Edwards* **OSID,** with adjustable dial pointer and 0–100 scale. Chromium plated brass construction, with two $\frac{1}{16}$ in unions at right angles ... ... Each **£9·55** *fx*

For low vacuum work, glass stopcocks and metal taps are available listed under STOPCOCKS and FURNITURE respectively.

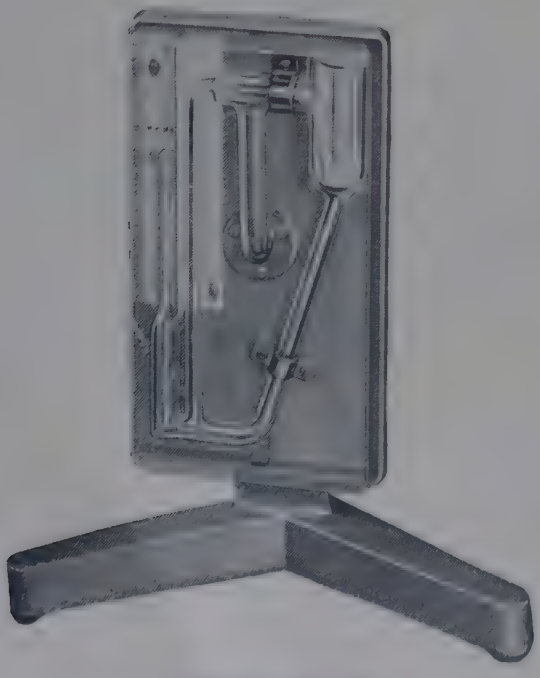


VB-770

10
15
5
20
0
SPEEDIVAC
torr
(mm Hg)

VB-942

DIAL VACUUM GAUGE, Bourdon tube
See GJ-330 in List No. sequence.



VB-960, VB-962

APIEZON VACUUM GREASES AND WAXES

Organic materials, highly refined for the most exacting vacuum requirements. Apiezon greases and waxes do not contain silicones and are therefore suitable for use with graduated glassware.

VB-880
APIEZON GREASE L, for sealing ground glass vacuum joints and for similar applications. The vapour pressure does not exceed 10^{-3} torr at 300°C. In 50 g tube. Each **£2·92** *fx*

VB-882
APIEZON GREASE M, for similar applications to VB-880 but with a vapour pressure not exceeding 10^{-3} torr at 200°C. In 100 g tube ... ... Each **£2·13** *fx*

VB-884
APIEZON GREASE N, a rubber grease for lubricating and sealing conical glass taps in vacuum apparatus. Unsuitable for use above 35°C; vapour pressure 10^{-3} torr. In 25 g tube ... ... Each **£3·19** *fx*

VB-886
APIEZON WAX W, for sealing joints in vacuum systems, with a softening point of 60°C and a vapour pressure of 10^{-6} torr at room temperature. Stick form in 1 lb (450 g) packet ... ... Each **£1·21** *fx*

Apiezon general purpose stopcock grease—see LX-225 in List No. sequence.

DIAL VACUUM GAUGES

These gauges employ an evacuated metal capsule as the pressure sensitive element which is unaffected by barometric changes. Accuracy is 2½% of full scale deflection.
The 10 cm diameter dial is housed in a metal case.

List No.	Range, torr	Each	
		£	
VB-942	0—20	**24·85**	*fxN*
VB-950	0—100	**24·85**	*fxN*
VB-955	0—760	**24·85**	*fxN*

Vacustat VACUUM GAUGES

These portable bench gauges are similar in principle to the McLeod gauge. The gauge is simple to use; the backing plate with attached head scale and reservoir being rotated through 90° to take a reading.

VB-960
VACUUM GAUGE, *Vacustat,* **Model IB2,** range 10 to 10^{-2} torr. With tripod stand, $\frac{1}{8}$ in union for connection to the vacuum system and a protective Perspex cover. Height 230 mm. **Requires but does not include approximately 100 g of triple distilled mercury.** Each **£17·85** *fx*

VB-962
VACUUM GAUGE, *Vacustat,* **Model 2B2,** as VB-960, but range 1 to 10^{-3} torr. **Requires but does not include approximately 150 g of triple distilled mercury.** Each **£18·40** *fx*

Triple distilled mercury see MF-932 in List No. sequence.

THERMAL (PIRANI) VACUUM GAUGES

These gauges operate by the change in temperature and hence in resistance of an electrically heated filament as the thermal conductivity of the surrounding gas changes with pressure. The resistance change is measured by a Wheatstone bridge circuit. Thus, a gauge will give a direct and continuous reading of the total gas and vapour pressure in a vacuum system.

VC-090

PRESSURE RANGES

List No.	Model No.	Pressure range torr	Glass gauge head	Metal gauge head
VC-090	10	3 to 10^{-3}	VC-092	VC-094
VC-120	8-2	1 to 5×10^{-3} 5×10^{-3} to 1×10^{-4}	VC-124	

VC-090
VACUUM GAUGE, Pirani, *Edwards* **Model 10,** as specification, for bench or panel mounting. Dimensions 13·5×11×13 cm. Suitable for use with one gauge head only. For 200/250V 50/60 Hz single phase supplies.
Without gauge head ... ... Each **£39·60** *fxN*

ACCESSORIES

VC-092 **Gauge head,** glass, *Edwards* G6B, for VC-090, with 14/23 cone connector and 14/23 borosilicate glass socket for connection to glass vacuum system. With 180 cm lead ... ... Each **£11·85** *fxN*

VC-094 **Gauge head,** metal enclosed, *Edward* M6B, for VC-090, with connection to suit ½ in bore, 0·596 in (15 mm) outside diameter metal piping. With 180 cm lead. Each **£11·85** *fxN*

VC-120
VACUUM GAUGE, Pirani, *Edwards Model* **8-2,** dual scale, as specification, with transistor stabilised voltage supply. For bench or panel mounting. Dimensions 22×17×19 cm. Two heads may be connected to one gauge; the current flowing continuously through the filaments of both and a selector switch being used to take readings from either. For 200/250V 50 Hz supplies.
Without gauge heads ... ... Each **£84·20** *fxN*

ACCESSORY

VC-124 **Gauge head,** glass, *Edwards* G5-C2 with 14/23 cone connector and 14/23 borosilicate glass socket for connection to glass vacuum system. With 180 cm lead. Each **£32·15** *fxN*

VC-120 with glass gauge head

VC-220

HIGH FREQUENCY TESTERS

When the probe of a high frequency tester is placed close to the wall of a glass vacuum system, a discharge is produced. With a knowledge of the gas in the system and from the appearance of the discharge, the pressure in the system can be deduced.

For leak detection, the probe is passed over the external surfaces of the system and any pinhole or crack will be located instantly by a thread like discharge running through it.

The probe unit is 25 cm long×56 mm diameter and is contained in a moulded plastics case. The probe of VC-240 is connected to a transformer unit which is fitted with a mains switch.

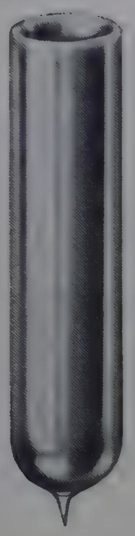
VC-220
HIGH FREQUENCY TESTER, *Edwards* **Model T1,** as specification, output 300 kHz. For 200/250V 50/60 Hz supplies. With 180 cm lead ... ... Each **£22·45** *fx*

VC-240
HIGH FREQUENCY TESTER, *Edwards* **Model T2,** as specification, output 4-5 MHz. For 200/250V 50/60 Hz supplies. With 180 cm lead ... ... Each **£40·65** *fxN*

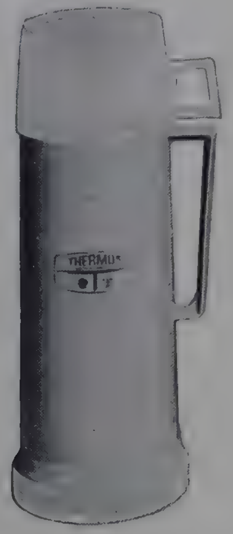
When ordering please state voltage and frequency of supply.

VACUUM VESSELS

NOTE: Listed capacities and dimensions are approximate.



VC-505



VC-521

VC-530

VC-550

VC-590

VC-505

VACUUM VESSELS, Dewar, cylindrical, silvered borosilicate glass.

Capacity	370	770	1150 ml	
Int. dia.	50	71	71 mm	
Int. depth	200	200	300 mm	
Each	**£3·80**	**5·30**	**5·30**	*mx*

VC-521

VACUUM FLASKS, *Thermos*, cylindrical, silvered glass, in plastics container, with improved screw stopper and moulded cup.

Capacity	450	1000 ml	
Neck dia.	28	39 mm	
Int. depth	170	200 mm	
Each	**£0·56**	**0·90**	*mx*

REPLACEMENT PARTS

VC-523 **Glass vessels.**

Capacity	450	1000 ml	
Each	**£0·36**	**0·60**	*mx*

VC-530

VACUUM FLASKS, *Thermos*, with silvered glass inner vessel. The wide mouth is closed by a stopper and covered by a moulded cap. For use with solids or liquids. With handle.

Capacity	1130	1700	4500 ml	
Neck dia.	86	109	86 mm	
Int. depth	170	185	260 mm	
Each	**£2·73**	**4·62**	**9·70**	*mx*

REPLACEMENT PARTS

VC-532 **Glass vessels.**

Capacity	1130	1700	4500 ml	
Each	**£1·80**	**2·80**	**5·00**	*mx*

VC-550

VACUUM FLASK, *Thermos*, 4·5 litre, with silvered borosilicate glass inner vessel, neck diameter 140 mm, internal depth 280 mm, in a heavy gauge metal canister. With an insulated lid fastened by clamps and incorporating an air vent to facilitate removal. For use with solids or liquids. With handle ... ... Each **£12·94** *mx*

REPLACEMENT PART

VC-552 **Glass vessel** ... ... Each **£5·00** *mx*

VC-590

VACUUM VESSEL, for the storage of liquefied nitrogen or oxygen. Comprises inner and outer aluminium spheres with the space between them insulated and evacuated for minimum heat transfer. The inner sphere is fitted with a rigid, low conductivity stainless steel neck tube.

Capacity	25 litres of liquefied gas
Loss/24 hrs liquid nitrogen	3½% approx.
Working pressure, max.	1·75 kgf/cm^2
Neck diameter	2·54 cm
Internal dimensions	38 cm dia. × 60 cm deep
Overall dimensions	46 cm dia. × 66 cm high
Weight, empty	7 kg
Weight, full	28 kg approx.

Each **£94·00** *fxN*

VAPOUR DENSITY APPARATUS

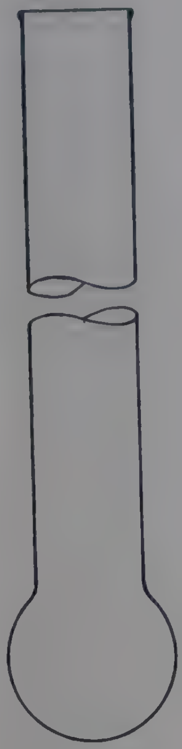
VM-015

VAPOUR DENSITY APPARATUS, (AG), **Victor Meyer,** comprising borosilicate glass jacket enclosing a borosilicate glass inner tube, overall length 81 cm, with a glass release rod fitted in the side tube. Supplied with ten 20 mm glass phials with ground-in stoppers.

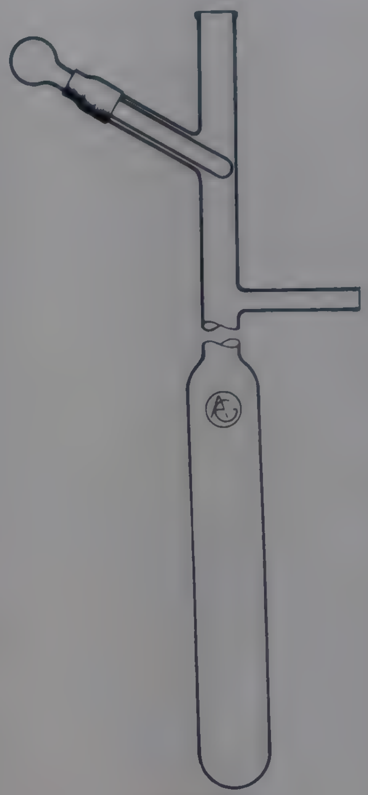
Each **£4·40** *ax*

REPLACEMENT PARTS

VM-020	**Jacket tube,** borosilicate glass.	Std. pack of 4	**£4·00**	Each	**£1·06**	*jx*
VM-025	**Inner tube**			Each	**£1·30**	*ax*
VM-030	**Phial**	Ten	**£1·95**	Each	**£0·26**	*ax*



VM-020



VM-025

VM-030

Van Slyke blood gas analysers	see	MC-500 et seq.
Variable speed stirrers	see	SS-510 et seq.
Variable output transformers	see	ED-600 et seq.
Vascula	see	BL-300
VDRL pipettes	see	ME-365
Venturi filter pumps	see	FD-215 et seq.
Vernier microscopes	see	CD-500 et seq.
Vibro spatula	see	SJ-402

For details and prices see entries in List No. sequence.

VISCOMETRY

SECTION INDEX

GLASS VISCOMETERS page
Cannon-Fenske 719
Falling sphere 716
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Suspended level 718
Ubbelohde suspended level 718

FLOW CUPS
British Standard 715
Ford 715
ISO 715
Zahn 716

ROTATIONAL VISCOMETERS page
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Portable, Ferranti 715

VISCOMETER BATHS
Maximum temperature 120°C 720
Maximum temperature 250°C 722

MISCELLANEOUS VISCOMETERS IN OTHER SECTIONS
Engler 531
EVT 530
Redwood 532
Standard tar 531

Gallenkamp UNIVERSAL TORSION VISCOMETERS

For testing liquids with Newtonian or anomalous viscosities.

Suitable for testing:

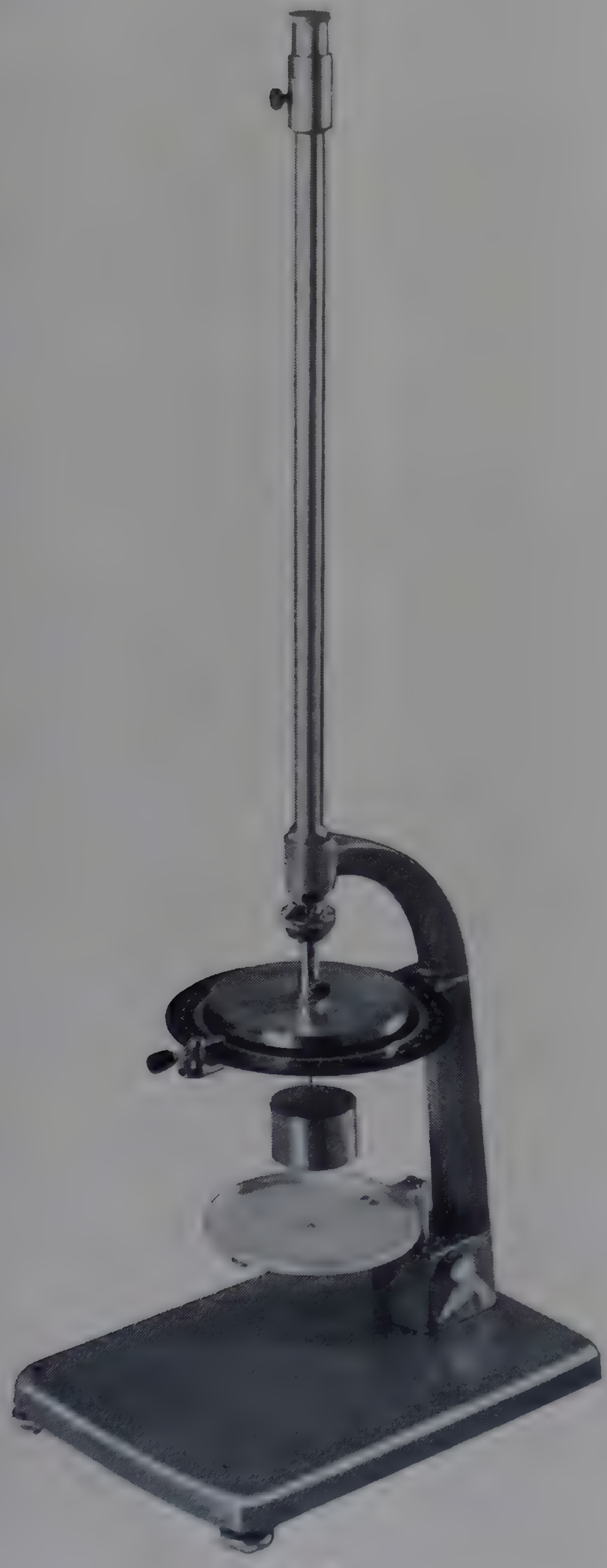
oils, dairy products, paints,

rubber latex, glues, gums,

inks, chocolate, sugars,

cosmetics, ceramics and many other materials

- **Viscosity range 0·25 to 10^3 poise extended to 10^6 poise with accessories**
- **Rapid results obtainable by unskilled operator**
- **Interchangeable torsion wires and cylinders**
- **Water jacketed cup for tests at temperatures other than ambient**



VS-010

Essentially the instrument comprises a vertical torsion wire, a flywheel mounted above a graduated scale and a cylinder suspended below the scale. The damping effect of the sample on the overswing of the cylinder, when the flywheel is rotated through 360° and released, is a measure of the viscosity. The higher the viscosity, the greater is the drag and the less is the overswing. A sample support table which swivels to one side and has two fixed vertical positions is provided. The viscometer is mounted on levelling feet but the guide aperture at the lower end of the torsion wire is fitted with a low friction bearing which makes critical levelling unnecessary.

THIXOTROPY AND ANOMALOUS VISCOSITIES

Modified viscometer VS-020 is recommended for use where thixotropic and anomalous viscosity materials are to be tested. This viscometer has an extra graduated scale at the top of the torsion wire so that torsion can be applied without disturbing the sample.

VS-010

VISCOMETER, universal torsion, *Gallenkamp*, as specification, with two interchangeable torsion wires 30 and 36 SWG, three cylinders $\frac{1}{4}$, $\frac{11}{16}$ and $1\frac{5}{8}$ in diameter and comprehensive instructions manual which includes calibration curves for cylinder and wire combinations supplied ... ... Each **£42·50** *bx*

VS-020

VISCOMETER, universal torsion, *Gallenkamp*, as VS-010 but modified for use as a thixotrometer as well as a viscometer. With comprehensive instructions manual which includes calibration curves for cylinder and wire combinations supplied ... ... Each **£45·00** *bx*

ACCESSORIES AND REPLACEMENTS

VS-030 **Cylinders.**

Diameter	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{11}{16}$	$1\frac{1}{4}$	$1\frac{5}{8}$ in	
Ten	**£9·40**	**10·00**	**12·80**	**13·40**	**19·00**	*bx*
Each	**£1·04**	**1·10**	**1·45**	**1·50**	**2·10**	

VS-032 **Wires, torsion.**

Gauge	24	26	28	30	32	34	36 SWG

All, Ten **£9·80** Each **£1·10** *bx*

VS-034 **Cup,** for containing sample, comprising plated metal cup with thermometer pocket mounted on a flat disk which fits in the centring guides of the sample table. Internal diameter 67 mm, internal depth 60 mm. Each **£3·20** *bx*

VS-035 **Cup,** as VS-034, but water jacketed permitting temperature control by water circulation ... Each **£11·90** *bx*

VS-036 **Stirrer,** to fit cups VS-034 or VS-035 ... Each **£2·30** *bx*

ROTATING CYLINDER VISCOMETERS

An outer cylinder driven by a synchronous motor rotates the sample and causes a drag on a coaxial inner cylinder. The resulting angular deflection of the latter is proportional to the viscosity. As the measurement of angular deflection is displayed continuously, the way in which viscosity varies with time (and temperature) at fixed ratio of shear can be studied.

VS-110
VISCOMETER, rotating cylinder, *Ferranti*, **Model VL,** with set of VL, VH and VM cylinders and 20 g cm torque spring. Viscosity range 0·168 to 97 poise; speed range 99·5 to 297·3 rev/min; shear rate 43 to 950 sec^{-1}. **For use at temperatures up to 30°C.** In leather case. For 200/250V 50 Hz single phase supplies ... Each **£349·35** *fxN*

VS-112
VISCOMETER, rotating cylinder, *Ferranti* **Model VL,** as VS-110 but **for use at temperatures up to 100°C.** For 200/250V 50 Hz single phase supplies. .. Each **£352·25** *fxN*

VS-115
VISCOMETER, rotating cylinder, *Ferranti* **Model VM,** with set of VM, VH and VL cylinders and 20 g cm torque spring. Viscosity range 0·33 to 1460 poise; speed range 15 to 159·1 rev/min; shear rate 4·7 to 508 sec^{-1}. **For use at temperatures up to 30°C.** In leather case. For 200/250V 50 Hz single phase supplies ... Each **£353·05** *fxN*

VS-117
VISCOMETER, rotating cylinder, *Ferranti* **Model VM,** as VS-115 but **for use at temperatures up to 100°C.** For 200/250V 50 Hz single phase supplies. Each **£365·65** *fxN*

For direct determination of the flow properties of true or thixotropic liquids at temperatures up to 100°C

VS-110

FLOW CUPS

Size or type	Orifice dimensions mm		Approximate viscosity range *, stokes
	Diameter	Length	
2	2·38	4·62	0·1 to 1
4	3·97	5·26	0·8 to 7
6	7·14	6·50	6·0 to 30
ISO	6	20	0·2 to 1·5
FORD No. 4	—	—	1 to 10

*Anomalous flow can cause an apparent variation from these ranges. BS 3900: A6 advises against conversion of flowtimes to viscosities.

VS-132
FLOW CUP, *Gallenkamp*, **size 2, to BS 3900: A6** and **BS 1733,** orifice dimensions as above tabulation. With integral skirt to protect the orifice ... Each **£7·20** *bx*

VS-134
FLOW CUP, *Gallenkamp*, as VS-132 but **size 4** to **BS 3900: A6 and BS 1733** ... ... Each **£7·20** *bx*

VS-136
FLOW CUP, *Gallenkamp*, as VS-132 but **size 6** to **BS 3900: A6 and BS 1733** ... ... Each **£7·20** *bx*

VS-132
to
VS-140

VS-145

VS-138
FLOW CUP, to ISO 2431, orifice dimensions as above tabulation ... ... Each **£15·00** *fx*

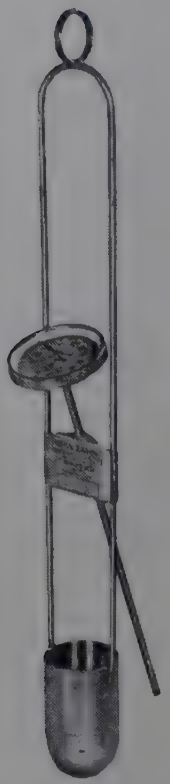
VS-140
FLOW CUP, *Gallenkamp*, **FORD No. 4,** adjusted to give a flow time of 50 seconds with an oil having a viscosity of 1·63 stokes. With integral skirt to protect the orifice. Each **£8·00** *bx*

ACCESSORY

VS-145 **Stand for VS-132 to VS-140 with base, levelling feet and rod with adjustable support bracket. Each £3·10** *bx*

STOPWATCHES see TR-010 et seq in List No sequence.

FLOW CUPS



VS-160 with TJ-970

VS-160

VISCOMETERS, ZAHN FLOW CUP, stainless steel, for the rapid, approximate measurement of the viscosities of clear and opaque fluids. The 44 ml capacity cup has a precision reamed orifice at the bottom and is suspended from a looped wire handle 30 cm in length. The viscometer is used by dipping the cup into the fluid to be tested, withdrawing it and timing the duration of the outflow. A bracket is mounted on the handle for fitting a bimetallic dial thermometer for simultaneous temperature measurement.

Size No.	1	2	3	
Viscosity range	20–85	30–170	170–550	cP
Orifice diameter	0·078	0·108	0·148	in
Size No.	**4**		**5**	
Viscosity range	200–900		250–1200	cP
Orifice diameter	0·168		0·208	in
All sizes			Each **£7·50**	*fx*

When ordering please state size required.

ACCESSORY

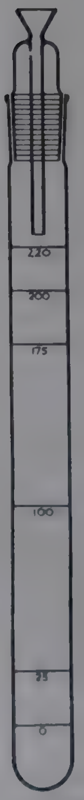
TJ-970 **Dial thermometers,** bimetallic with stainless steel case and stem 200 mm long

Scale span	—10 to 110	0 to 220	0 to 400°C
Subdivision	1	2	5degC

For prices see entry in List No. sequence.

Technico FALLING SPHERE VISCOMETERS

REGD. TRADE MARK



VS-202

VS-202

VISCOMETERS, FALLING SPHERE, *Technico,* to BS 188, borosilicate glass, comprising a fall tube, graduated at six points, fitted with a 24/29 socket and a stopper with a ball release tube. **Without balls.**

Int. dia. of fall tube	25	40 mm	
Each	**£2·25**	**2·40**	*ax*

REPLACEMENT PARTS AND ACCESSORIES

VS-205 **Fall tubes,** 24/29 socket, without steel balls or stopper.

Int. dia.	25	40 mm	
Each	**£1·40**	**1·70**	*ax*

VS-206 **Steel balls,** density 7·785 g/cm³. Viscosity ranges quoted in stokes. In packs of 100.

Diameter	1/16	3/32	1/8	5/32 in	
Viscosity range					
from	10	25	45	70	
to	375	850	1500	2350	
Pack	**£0·60**	**0·30**	**0·30**	**0·65**	cx

The 1/16 in and 3/32 in balls are suitable for both tubes, and the 1/8 in and 5/32 in balls for the 40 mm tube only.

VS-207 **Stopper,** with 24/29 cone and ball release tube ... ... Each **£0·80** *ax*

Technico STANDARD U-TUBE VISCOMETERS

REGD. TRADE MARK

VS-220

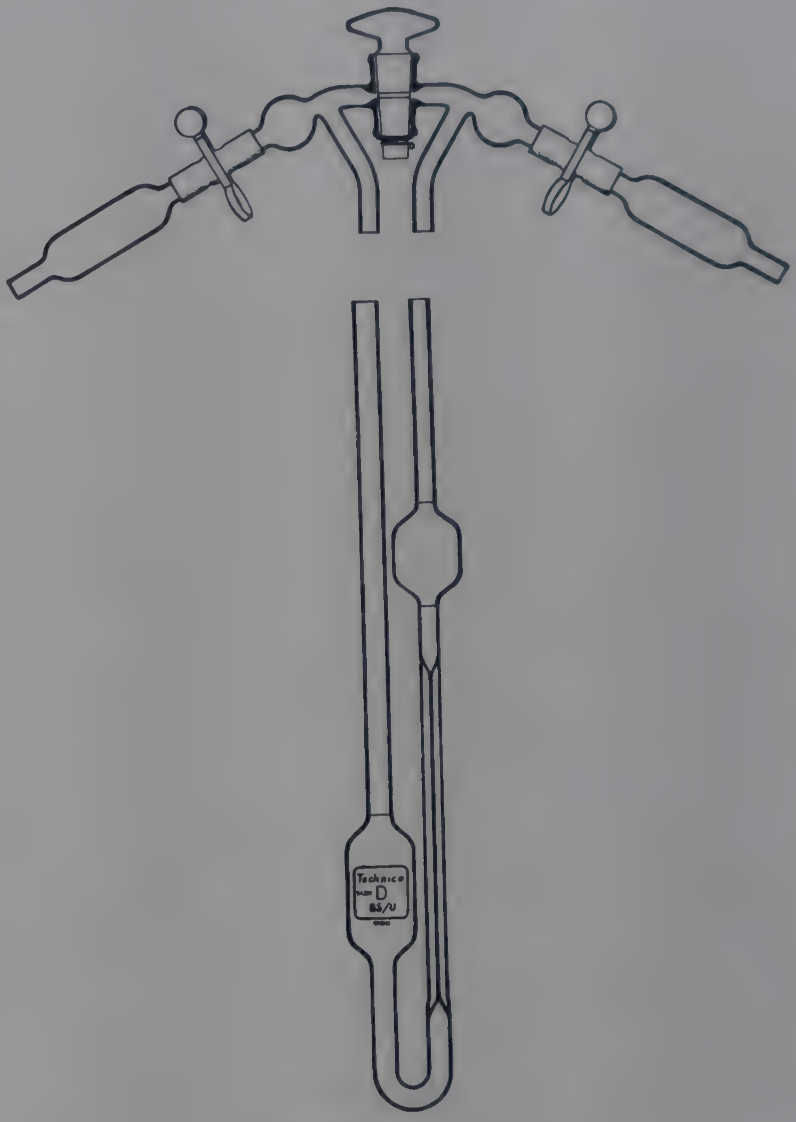
VISCOMETERS, STANDARD U-TUBE, *Technico*, type BS/IP, to ASTM D445–IP 71 and ASTM D2515, and type BS/U to BS 188. For transparent liquids.

Viscometer size	O	A	B	C	D	
Nominal constant	0·001	0·003	0·01	0·03	0·1	cS/s
Viscosity range, approx.	0·3–3	1·5–10	4–10	7·5–35	20–120	cS

All sizes Ten **£25·50** Each **£2·85** *ax*

Viscometer size	E	F	G	H	
Nominal constant	0·3	1·0	3·0	10	cS/s
Viscosity range, approx.	60–500	200–1,000	600–4,000	2,000–15,000	cS

All sizes Ten **£25·50** Each **£2·85** *ax*



VS-220 with VS-228

VS-225

VISCOMETERS, STANDARD U-TUBE, *Technico*, as VS-220 but with **works certificate of calibration** ... Each **£7·40** *ax*

VS-227

VISCOMETERS, STANDARD U-TUBE, *Technico*, as VS-220 but with **NPL certificate of examination giving the calibration constant** ... ... Each **£23·50** *ax*

When ordering VS-225 and VS-227 please state viscometer size required.

ACCESSORY

VS-228 **Sealing device,** for viscometers VS-220 to VS-227 comprising stopcock branch tube and two desiccant bulbs... Set **£2·15** *ax*

Technico REVERSE FLOW U-TUBE VISCOMETERS

REGD. TRADE MARK

VS-250

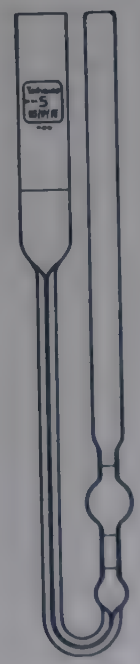
VISCOMETERS, REVERSE FLOW U-TUBE, *Technico*, reverse flow type BS/IP U-tube to ASTM D445–IP 71 and ASTM D2515, and type BS/IP/RF to BS 188. For transparent and opaque liquids.

Viscometer size	1	2	3	4	5	6	
Nominal constant	0·003	0·01	0·03	0·1	0·3	1	cS/s
For min. viscosity	1·2	2	6	20	60	200	cS

All sizes Ten **£30·00** Each **£3·30** *ax*

Viscometer size	7	8	9	10	11	
Nominal constant	3	10	30	100	300	cS/s
For min. viscosity	600	2,000	6,000	20,000	60,000	cS

All sizes Ten **£30·00** Each **£3·30** *ax*



VS-250

VS-255

VISCOMETERS, REVERSE FLOW U-TUBE, *Technico*, as VS-250 but with **works certificate of calibration** ... ... Each **£9·85** *ax*

VS-257

VISCOMETERS, REVERSE FLOW U-TUBE, *Technico*, as VS-250 but with **NPL certificate of examination giving the calibration constant.** Each **£52·00** *ax*

When ordering VS-255 and VS-257 please state viscometer size required.

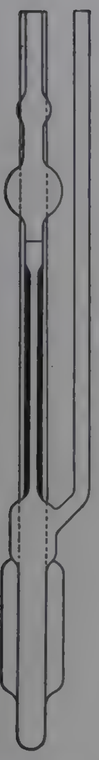
ACCESSORY

VS-258 **Pipette,** for adjusting filling level in viscometers VS-250 to VS-257. Each **£0·75** *ax*

Technico SUSPENDED LEVEL VISCOMETERS

REGD. TRADE MARK

Type BS/IP/SL



VS-280

VS-280

VISCOMETERS, SUSPENDED LEVEL, *Technico,* suspended level type BS/IP/SL, to ASTM D445–IP 71, ASTM D2515 and BS 188. For transparent liquids.

Viscometer size	1	1A	2	2A	3	
Nominal constant	0·01	0·03	0·1	0·3	1	cS/s
For min. viscosity	3·5	6	20	60	200	cS

All sizes Ten **£27·50** Each **£3·10** *ax*

Viscometer size	3A	4	4A	5	
Nominal constant	3	10	30	100	cS/s
For min. viscosity	600	2000	6000	20,000	cS

All sizes Ten **£27·50** Each **£3·10** *ax*

VS-285

VISCOMETERS, SUSPENDED LEVEL, *Technico,* as VS-280 but with **works certificate of calibration** ... ... Each **£7·60** *ax*

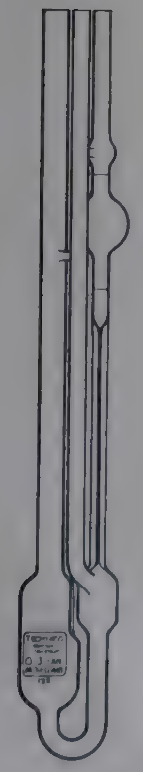
VS-287

VISCOMETERS, SUSPENDED LEVEL, *Technico,* as VS-280 but with **NPL certificate of examination giving the calibration constant.** Each **£23·50** *ax*

When ordering VS-285 and VS-287 please state viscometer size required.

Technico UBBELOHDE SUSPENDED LEVEL VISCOMETERS TO ASTM D445-IP71

REGD. TRADE MARK



VS-290

VS-290

VISCOMETERS, SUSPENDED LEVEL, *Technico,* Ubbelohde suspended level to ASTM D445–IP 71 and ASTM 2515. For transparent liquids.

Viscometer size	1	1C	1B	2	2C	
Nominal constant	0·01	0·03	0·05	0·1	0·3	cS/s
Viscosity range, approx.	2–10	6–30	10–50	20–100	60–300	cS

All sizes Ten **£30·00** Each **£3·30** *ax*

Size No.	2B	3	3C	3B	4	
Nominal constant	0·5	1·0	3·0	5·0	10·0	cS/s
Viscosity range, approx.	100–500	200–1000	600–3000	1000–5000	2000–10,000	cS

All sizes Ten **£30·00** Each **£3·30** *ax*

VS-295

VISCOMETERS, SUSPENDED LEVEL, *Technico,* as VS-290 but with **works certificate of calibration** ... ... Each **£7·80** *ax*

VS-297

VISCOMETERS, SUSPENDED LEVEL, *Technico,* as VS-290 but with **NPL certificate of examination giving the calibration constant.** Each **£24·00** *ax*

When ordering VS-295 and VS-297 please state viscometer size required.

Technico CANNON—FENSKE VISCOMETERS

REGD. TRADE MARK

Type BS/IP/CF

VS-310

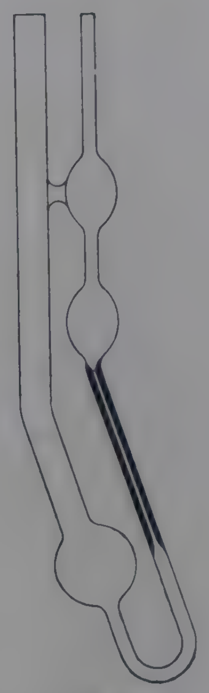
VISCOMETERS, CANNON-FENSKE, *Technico*, Cannon-Fenske routine to ASTM D445–IP 71 and ASTM D2515, and type BS/IP/CF to BS 188. For transparent liquids.

Viscometer size	25	50	100	150	200	300	
Nominal constant	0·002	0·004	0·015	0·035	0·1	0·25	cS/s
Viscosity range, approx.	0·4–1·6	0·8–3·2	3–12	7–28	20–80	50–200	cS

All sizes Ten **£27·50** Each **£3·10** *ax*

Viscometer size	350	400	450	500	600	
Nominal constant	0·5	1·2	2·5	8	20	cS/s
Viscosity range, approx.	100–400	240–960	500–2,000	1,600–6,400	4,000–16,000	cS

All sizes Ten **£27·50** Each **£3·10** *ax*



VS-310

VS-315

VISCOMETERS, CANNON-FENSKE, *Technico*, as VS-310 but with **works certificate of calibration** ... ... Each **£7·60** *ax*

VS-317

VISCOMETERS, CANNON-FENSKE, *Technico*, as VS-310 but with **NPL certificate of examination giving the calibration constant.** Each **£23·50** *ax*

When ordering VS-315 and VS-317 please state viscometer size required.

CLEANING CAPILLARY VISCOMETERS

It is perhaps not well known that dust particles are often responsible for poor results from viscometers with constants of 0·3 cS/sec or less. An effective cure for the trouble is to filter all washing solvents and all samples through Ⓐ sintered glass filters of porosity 1.

Viscometers when not in use must be kept covered. During use a short length of 1 mm bore glass tubing attached to the viscometer by rubber tubing prevents the ingress of dust.

Dust particles are difficult to see but fortunately most are doubly refracting. Thus they become clearly visible when the sample containing them is viewed between crossed polarising film sheets.

Ultrasonic bath

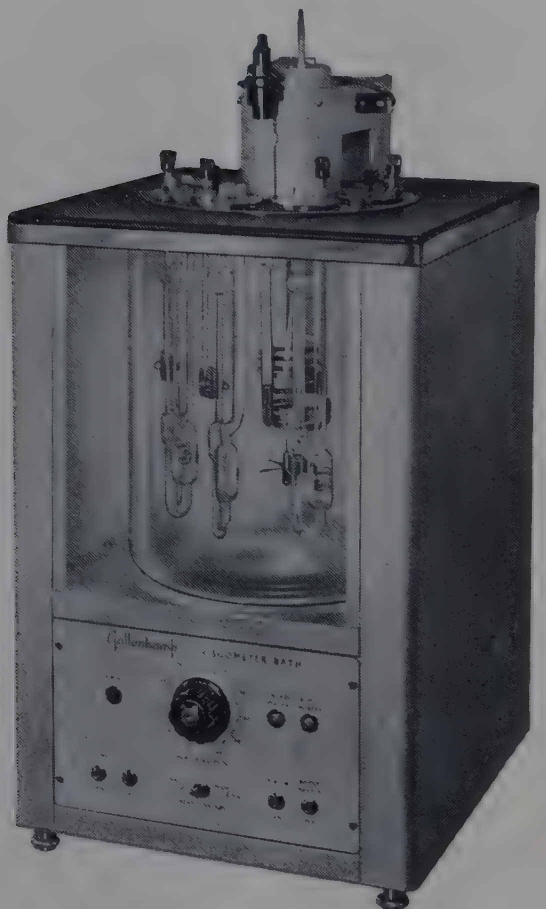
CLEANING

Viscometer tubes must be thoroughly clean to achieve good repeatable results. Satisfactory cleaning can be obtained by using:

(i) CM-754 Cleaner—a powerful non-corrosive surfactant.
(ii) UL-150 Ultrasonic bath—45 cm deep and thermostatically controlled up to 95°C.

Gallenkamp VISCOMETER BATH, 120°C

For the determination of kinematic viscosity by capillary viscometer methods including those specified in ASTM D445—IP71, BS 188, DIN 51550 and 51562. Also for any other methods involving the precise measurement of viscosity such as control of polymer molecular weight by specific or relative viscosity measurement.



VS-615 with accessories

- **Accommodates up to 8 viscometers**
- **Unique turntable holder permits each viscometer to be brought to the front as required**
- **Workspace illuminated brilliantly but without glare**
- **Temperature controlled with maximum precision**
- **Designed for easy cleaning and simple maintenance**
- **Built-in boost for initial heating**
- **Suitable for use up to 120°C (250°F)**

PERFORMANCE

Temperature range		†Ambient to 120°C
Temperature fluctuation	Up to 40°C	±0·005degC
	Up to 100°C	±0·015degC

†For operation near or just below ambient temperature cooling coil VS-641 must be fitted and supplied with cold water.

CONTROLS

To minimise temperature fluctuations resulting from thermostat switching, two energy input controls are provided. Coarse control is by a switch which selects suitable circuits for low and high temperature operation respectively; fine control is by a variable autotransformer.

Thermostatic control is by contact thermometers which have short ranges to suit all the common standard test temperatures.

DIMENSIONS

	H	W	D
Overall	73 ×	50 ×	40 cm

Tank capacity 17 litres approx.
Power rating 1000W max.

CONSTRUCTION

The viscometer bath is a compact and self-contained unit comprising a borosilicate glass tank, with a light diffusing panel at the rear. The tank is enclosed in a grey stoved enamel finished steel case with levelling feet. The case, which has a white interior, is fitted with a toughened glass front window and a laminated plastics top. A freely moving annular turntable with positions for eight viscometer holders is built into the top and permits each viscometer as required to be brought to the front without disturbance. Blank covers are available for turntable positions not in use. The thermoregulating unit is supported over the centre of the bath by a cantilever from the rear of the top cover. All electrical controls are mounted on a drawer chassis in the lower part of the case beneath the bath. The fluorescent lamp is mounted on the rear panel of the case behind the diffusing panel of the glass tank.

NOTE: For temperatures up to 60°C water is a suitable bath liquid but for continuous working above this temperature ethylene glycol or white mineral oil may be used to advantage.

Gallenkamp VISCOMETER BATH

VS-615

VISCOMETER BATH, thermostatic, *Gallenkamp*, accommodates up to 8 viscometer tubes, at temperatures up to 120°C (250°F), as specification. Comprising cylindrical borosilicate glass tank, fluorescent lamp, stirring motor and paddle, viscometer turntable, control and boost heaters, variable autotransformer and spare fluorescent lamp. **Without contact thermometer, indicating thermometer, viscometer holders or blank covers.** For single phase supplies only.

220/240V 50 Hz	Each	**£284·00**	*bx*
200/210V 50 Hz	Each	**£289·00**	*bxN*
110/120V 60 Hz	Each	**£294·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

VS-620	**Heater,** 500W, long, for normal heating.	Each	**£7·80**	*bx*
VS-621	**Heater,** 500W, short for boost heating.	Each	**£7·90**	*bx*
OD-124	**Stirrer motor.** For price see entry in List No. sequence.			
VS-627	**Tank,** borosilicate glass, with diffusing panel.	Each	**£24·00**	*bx*
VS-629	**Lamp,** fluorescent, 8W	Each	**£0·60**	*mx*

When ordering replacement parts please state serial number of viscometer bath and supply voltage.

ACCESSORIES

Four types of viscometer holders are listed which between them can accommodate the most popular range of viscometers described in BS 188 and ASTM D445–IP 71.

VS-630	**Viscometer holder**	See Selection Chart below.	Each	**£3·40**	*bx*
VS-632	**Viscometer holder**				
VS-633	**Viscometer holder**				
VS-634	**Viscometer holder**				
VS-638	**Blank cover,** for turntable		Each	**£1·40**	*bx*
VS-639	**Contact thermometers,** with connector.				

Range	60 to 80	80 to 110	115 to 135°F	
Each	**£11·00**	**11·00**	**11·00**	*bx*
Range	125 to 145		195 to 215°F	
Each	**£11·00**		**11·00**	*bx*

SELECTION CHART

Contact thermometer range	To suit test temperatures
60°F to 80°F	20°C, 25°C, 70°F
80°F to 110°F	100°F
115°F to 135°F	50°C, 130°F
125°F to 145°F	60°C, 140°F
195°F to 215°F	100°C, 200°F, 210°F

Indicating thermometers, IP Kin Visc, see TK-546 to TK-558 in List No. sequence.

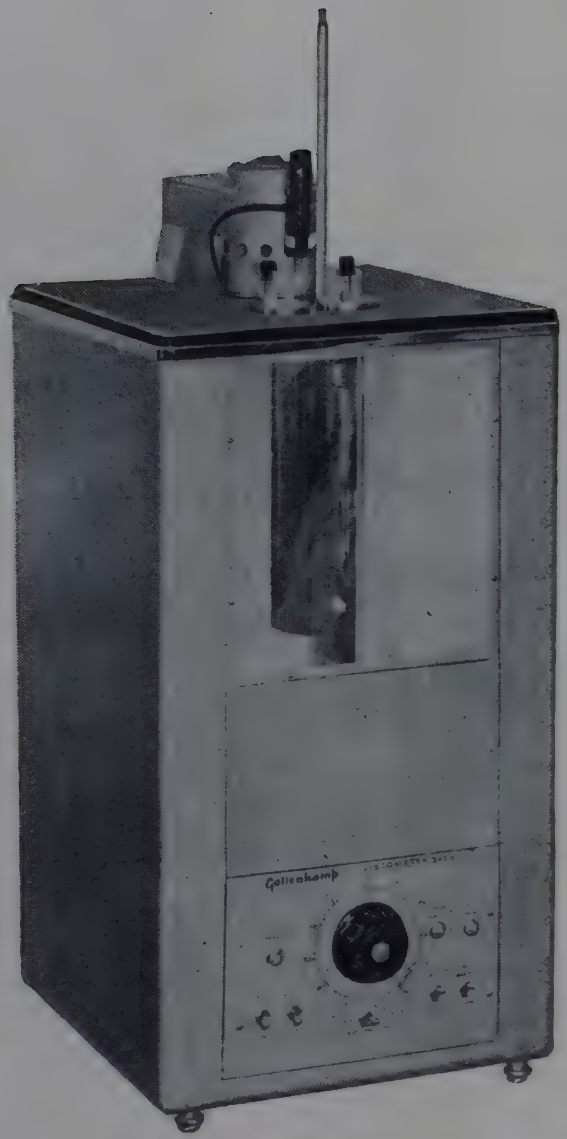
VS-641	**Cooling coil,** for operating bath below or near to ambient temperature. With connections for 8 mm bore flexible tubing	Each	**£2·50**	*bx*
LX-110	**Lubricant,** suitable for stirrer motor. For price see entry in List No. sequence.			

VISCOMETER HOLDERS SELECTION CHART

Viscometer Holder List No.	Suitable for Viscometers				
	Viscometer List No.	Sizes	Specification	Description	Type
VS-630	VS-220	All	ASTM D445–IP 71 ASTM D2515 BS 188	U-tube U-tube	BS/IP BS/U
	VS-280	1–4	ASTM D445–IP 71 ASTM D2515, BS 188	Suspended level	BS/IP/SL
VS-632	VS-280	4A and 5	ASTM D445–IP 71 ASTM D2515, BS 188	Suspended level	BS/IP/SL
VS-633	VS-290	All	ASTM D445–IP 71 ASTM D2515	Suspended level	Ubbelohde
VS-634	VS-250	All	ASTM D445–IP 71 ASTM D2515 BS 188	Reverse flow Reverse flow	BS/IP U-tube BS/IP/RF
	VS-310	All	ASTM D445–IP 71 ASTM D2515 BS 188	Cannon-Fenske Cannon-Fenske	Routine BS/IP/CF

Gallenkamp VISCOMETER BATH, 250°C

For viscosity determinations at temperatures between 30 and 250°C



VS-670 with accessories

- **Dewar pattern tank for minimum heat loss**
- **Insulated top with holes to accept two viscometer holders**
- **Workspace illuminated brilliantly but without glare**
- **Temperature controlled with maximum precision**
- **Designed for easy cleaning and simple maintenance**
- **Built-in boost for initial heating**

PERFORMANCE

Temperature ranges:	
using water	Ambient +10degC to 60°C
using white oil	60°C to 120°C
using silicone oil	120°C to 250°C
Temperature fluctuation	±0·025degC
Heating time to 250°C	2½ hours

CONTROLS

To minimise temperature fluctuations resulting from thermostat switching, two energy input controls are provided. Coarse control is by a switch which selects suitable circuits for low and high temperature operation respectively; fine control is by a variable autotransformer.

Thermostatic control is by contact thermometer. A contact thermometer range 0 to 250°C is available but, to obtain the minimum fluctuation a narrow range thermometer is recommended. Nine of these covering temperature range 25 to 250°C are offered.

CONSTRUCTION

The viscometer bath is a Dewar tank, internally silvered apart from clear strips at the front and back for illuminating and viewing the viscometers. The tank is housed in a grey stoved enamel finished steel case with a toughened glass front window, asbestos lined laminated plastics top and levelling feet. The top cover has holes to accept two purpose-made viscometer holders with insulated tops. When not in use, these may be replaced by insulated blank covers. The thermoregulating unit is supported over the centre of the bath by a cantilever from the rear of the top cover. All electrical controls are mounted on a drawer chassis in the lower part of the case beneath the bath. The fluorescent lamp is situated behind the bath, on the rear panel of the case.

DIMENSIONS

	H W D
Overall	82 × 50 × 40 cm
Tank capacity	7 litres approx.
Power rating	1000W max.

Gallenkamp HIGH TEMPERATURE VISCOMETER BATH

VS-670

VISCOMETER BATH, thermostatic, high temperature, *Gallenkamp*, to accommodate two viscometer tubes VS-694, for temperatures up to 250°C, as specification with cylindrical Dewar tank, fluorescent lamp, stirring motor and paddle, insulated covers for two test positions, control and boost heaters, variable auto-transformer and spare fluorescent lamp. **Without viscometers, viscometer holders, contact thermometers, indicating thermometer or filling liquid.** For single phase supplies only.

220/240V 50 Hz	Each	**£429·00**	*bx*
200/210V 50 Hz	Each	**£431·00**	*bxN*
110/120V 60 Hz	Each	**£450·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

VS-672	**Tank,** Dewar vessel only	Each **£16·00** *bx*	
VS-620	**Heater,** 500W, long, for normal heating		For prices see entries in List No. sequence.
VS-621	**Heater,** 500W, short, for boost heating		
OD-124	**Stirrer motor**		
VS-629	**Lamp,** fluorescent, 8W		

When ordering replacement parts please state serial number of viscometer bath and supply voltage.

ACCESSORIES

VS-685 **Contact thermometer,** wide range 0 to 250°C, with connector, lead and plug... ... ... Each **£14·50** *bx*

VS-688 **Contact thermometers,** narrow range, with connector. Ranges: 25 to 50°C, 50 to 75°C, 75 to 100°C, 100 to 125°C, 125 to 150°C, 150 to 175°C, 175 to 200°C, 200 to 225°C, 225 to 250°C ... ... Each **£15·50** *bx*

When ordering please state range or ranges required.

Indicating thermometers, 1P Kin Visc., see TK-546 to TK-533 in List No. sequence.

VS-690 **Viscometer holders,** with insulated tops.

For viscometers	BS/IP and BS/IP/SL size 1 to 4	BS/IP/SL size 4A and 5
Both sizes		Each **£17·00** *bx*

For viscometers	Ubbelohde suspended level	BS/IP/RF and BS/IP/CF
Both sizes		Each **£17·00** *bx*

VS-694 **Viscometers, extended limbs,** for use with VS-690.

Type	BS/IP	BS/IP/RF	BS/IP/SL	BS/IP/CF
All sizes and types				Each **£4·65** *axN*

Sizes as for appropriate viscometers VS-220, VS-250, VS-280 and VS-310 on pages 717 to 719.

When ordering please state size and type of viscometer.

LX-110 **Lubricant,** suitable for stirrer motor. For price see entry in List No. sequence.

Gallenkamp THERMOSTATIC WATER BATH

WITH SUPPORT PLATE TO ACCOMMODATE VISCOMETER HOLDERS

- **Maximum temperature 90°C**
- **Good visibility—all glass tank**
- **Control by Thermo Stirrer with contact thermometer and solid state switching**

For details and prices see WF-850 with accessories WF-864 and WF-866 in List No. sequence.

Technico VOLUMETRIC GLASSWARE

REGD. TRADE MARK

BURETTES

With permanent graduations and inscriptions in amber stain

Without stopcock

BW-044
BURETTES, *Technico,* **Class B,** with nipple end.
Capacities 25 and 50 cm³.

With ptfe stopcock

BW-064
BURETTES, *Technico,* **Class B.**
Capacities 5 to 50 cm³.

With straight bore glass stopcock

BW-084
BURETTES, *Technico,* **Class B.**
Capacities 1 to 100 cm³.

Technico AMBER GLASS BURETTES	see BW-224
Technico DISPENSING BURETTES	see BW-334
Technico SCHELLBACH BURETTES	see BW-284 et seq.
Technico BULB BURETTES	see BW-446
Technico AUTOMATIC BURETTES	see BW-524 et seq.
Technico GAS BURETTES	see GD-020 et seq.

With straight bore interchangeable glass stopcock

BW-085
BURETTES, *Technico,* **Class B.**
Capacities 5 to 50 cm³.

BW-086
BURETTES, *Technico,* **Class A.**
Capacities 1 to 100 cm³.

BW-087
BURETTES, *Technico,* **Class A,** with **works certificate of examination.**
Capacities 1 to 100 cm³.

BW-088
BURETTES, *Technico,* **BST stamped Class A.**
Capacities 10 to 50 cm³.

With double oblique bore glass stopcock

BW-134
BURETTES, *Technico,* **Class B.**
Capacities 1 to 100 cm³.

BW-136
BURETTES, *Technico,* **Class A.**
Capacities 1 to 100 cm³.

BW-137
BURETTES, *Technico,* **Class A,** with **works certificate of examination.**
Capacities 1 to 100 cm³.

BW-138
BURETTES, *Technico,* **BST stamped Class A.**
Capacities 10 to 50 cm³.

GRADUATED CYLINDERS

With permanent graduations and inscriptions in amber stain

With spout

CY-104
CYLINDERS, *Technico,* **Class B.**
Capacities 5 to 2000 cm³.

CY-105
CYLINDERS, *Technico,* **Class B,** with **works certificate of examination.**
Capacities 5 to 2000 cm³.

With stopper

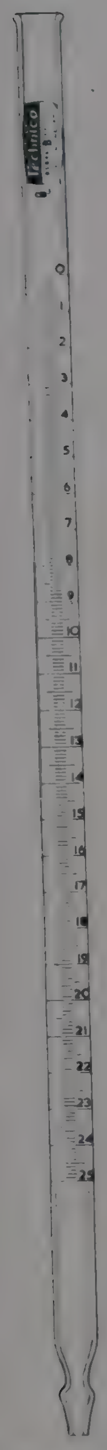
CY-244
CYLINDERS, *Technico,* **Class B.**
Capacities 5 to 2000 cm³.

CY-245
CYLINDERS, *Technico,* **Class B,** with **works certificate of examination.**
Capacities 5 to 2000 cm³.

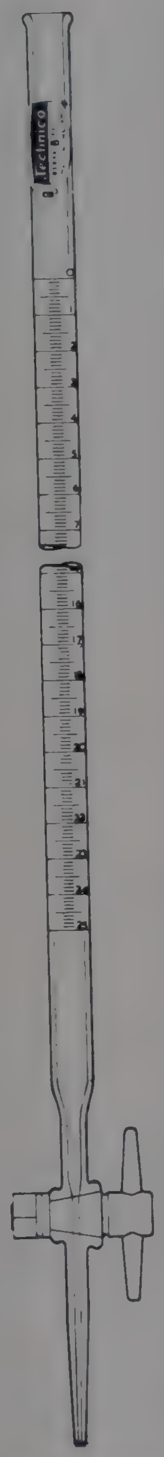
For details and prices of *Technico* burettes and cylinders see entries in List No. sequence.

Technico VOLUMETRIC GLASSWARE

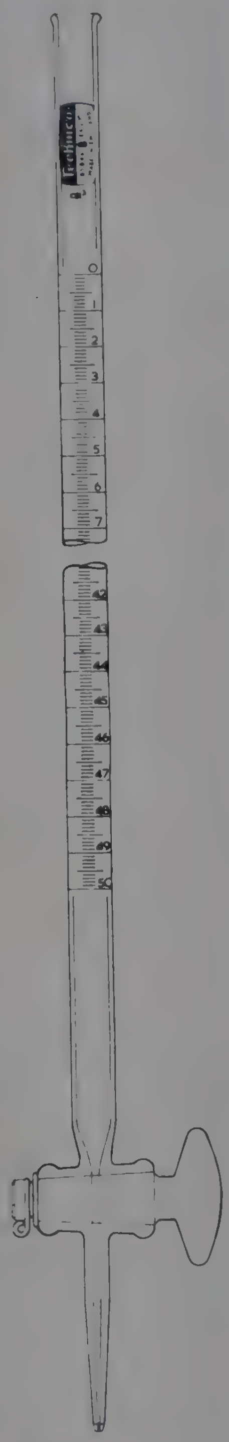
REGD. TRADE MARK



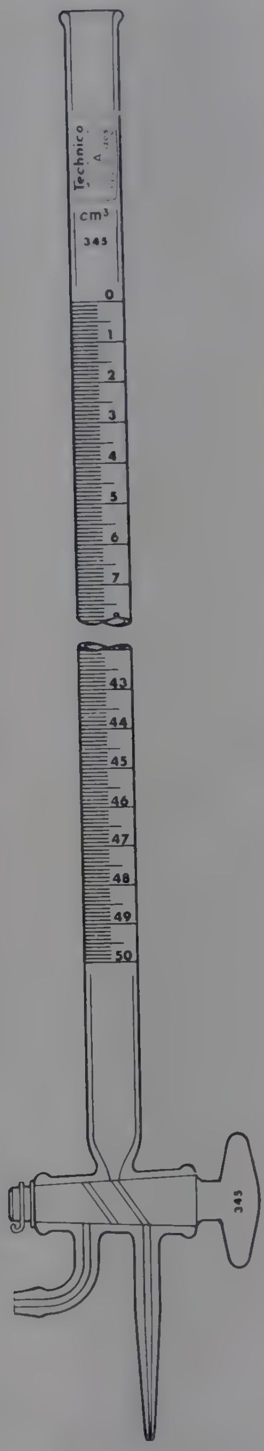
Nipple end



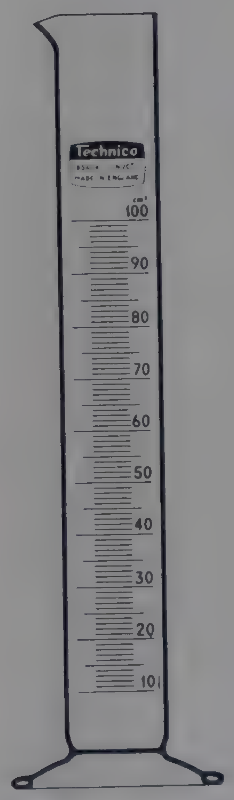
ptfe stopcock



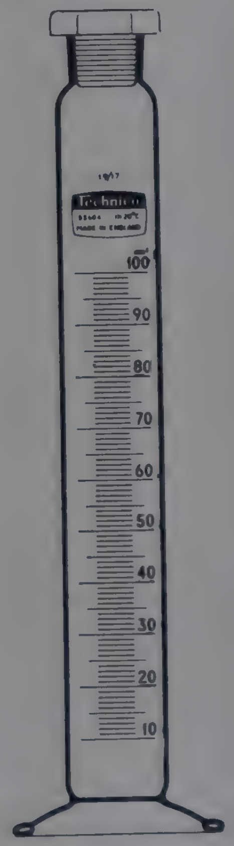
Straight bore stopcock



Oblique bore stopcock



With spout



With stopper

BRITISH STANDARDS

All articles for which British Standards (BS) exist are manufactured to such standards, the remainder being made to our own stringent specifications.

CALIBRATION TEMPERATURE

Technico volumetric glassware in accordance with British Standards is calibrated at 20°C. We shall be pleased to manufacture volumetric glassware calibrated at 27°C to special order.

STOPCOCK LUBRICATION

Only a minimum of lubricating grease should be smeared evenly over the surface of the key. Rubber greases such as LX-210 or LX-220 are particularly suitable.

NEVER use silicone grease to lubricate stopcocks on volumetric glassware because during use it 'migrates' and contaminates the inner surface of the glass. Such contamination prevents wetting of the glass, distorts the meniscus, alters drainage and thus destroys accuracy.

Technico VOLUMETRIC GLASSWARE

REGD. TRADE MARK

ONE-MARK FLASKS

With permanent graduations and inscriptions in amber stain

Clear glass without stopper

FK-054

FLASKS, *Technico,* **Class B.**
Capacities 10 to 500 cm³.

Technico KOHLRAUSCH FLASKS	see FK-134 and FK-136
Technico SUGAR FLASKS	see FK-164 and FK-176
Technico BREWERS MASH FLASK	see FK-204
Technico HIRSCHSOHN FLASKS	see FK-244
Technico SULPHONATION FLASK	see PE-120

Clear glass with stoppers

FK-074

FLASKS, *Technico,* **Class B.**
Capacities 1 to 2000 cm³.

FK-076

FLASKS, *Technico,* **Class A.**
Capacities 5 to 2000 cm³

FK-077

FLASKS, *Technico,* **Class A with works certificate of examination.**
Capacities 5 to 2000 cm³.

Amber glass flasks with stoppers

FK-084

FLASKS, *Technico,* **Class B.**
Capacities 25 to 1000 cm³.

PIPETTES

With permanent graduations and inscriptions in amber stain

Colour coded to BS 3996

One-mark and bulb

PM-104

PIPETTES, *Technico,* **Class B.**
Capacities 0·5 to 100 cm³.

PM-105

PIPETTES, safety, *Technico,* **Class B,** with safety bulb.
Capacities 5 to 25 cm³.

PM-106

PIPETTES, *Technico,* **Class A.**
Capacities 0·5 to 100 cm³.

PM-107

PIPETTES, *Technico,* **Class A, with works certificate of examination.**
Capacities 0·5 to 100 cm³.

Technico SEROLOGICAL PIPETTES	see ME-260 et seq.
Technico MICRO PIPETTES	see PM-486 et seq.
Technico AUTOMATIC PIPETTES	see PM-664 et seq.

Graduated

PM-344

PIPETTES, *Technico,* **Class B,** for delivery from top zero.
Capacities 1 to 25 cm³.

PM-346

PIPETTES, *Technico,* **Class A,** for delivery from top zero.
Capacities 1 to 25 cm³.

PM-364

PIPETTES, *Technico,* **Class B,** for delivery from any graduation.
Capacities 1 to 25 cm³.

PM-366

PIPETTES, *Technico,* **Class A,** for delivery from any graduation.
Capacities 1 to 25 cm³

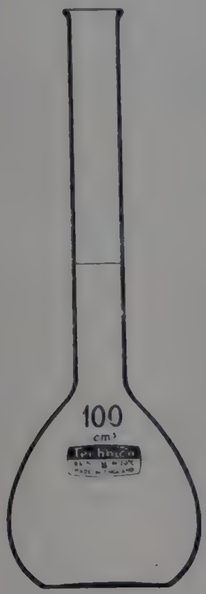
PM-384

PIPETTES, *Technico,* **Class B,** for content.
Capacities 1 to 25 cm³.

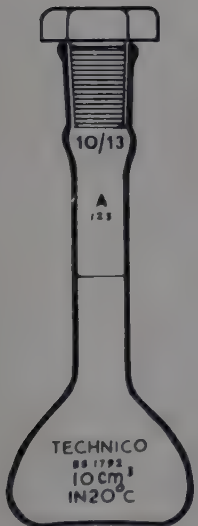
For details and prices of *Technico* volumetric flasks and pipettes see entries in List No. sequence.

Technico VOLUMETRIC GLASSWARE

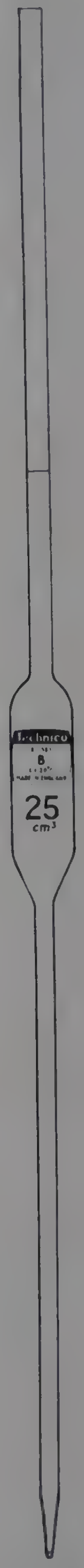
REGD. TRADE MARK



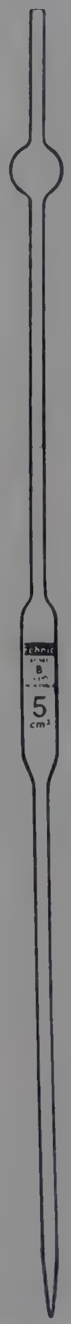
without stopper



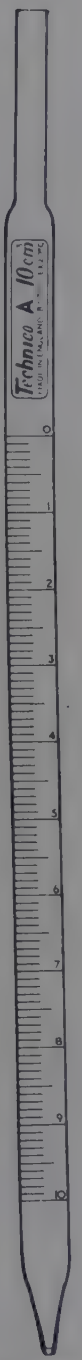
with stopper



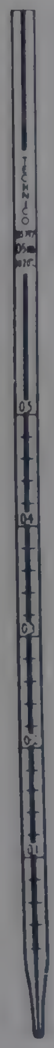
bulb



safety bulb



graduated



micro

GRADES OF ACCURACY

Most items of *Technico* volumetric glassware are available as follows:—

***Technico* Class A.**
REGD. TRADE MARK

Available with or without works certificate and of similar quality to the BST grade and equally suitable for work of the highest degree of accuracy. It meets all BS requirements for Class A and works certificates are issued on the basis of BST approved methods of test which in the case of divided scale articles, give measured values at 5 test points. All corrections are given to the same degree of accuracy as on the corresponding BST certificates.

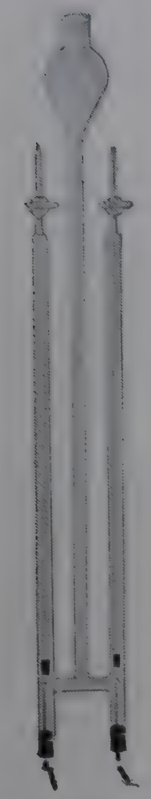
***Technico* BST stamped Class A.**
REGD. TRADE MARK

Primarily used for referee purposes, marked with the BST monogram and supplied complete with test certificate showing the value of any corrections to be applied.

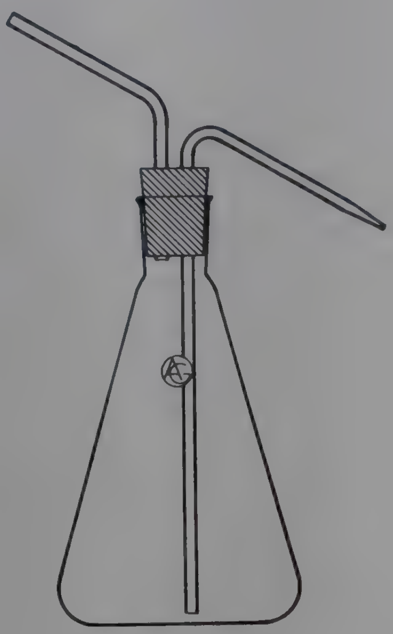
***Technico* Class B.**
REGD. TRADE MARK

Manufactured to BS Class B requirements to provide a reliable quality for routine work.

NOTE: Class A volumetric glassware has approximately twice the accuracy of Class B.



VX-022 with VX-023



WB-040

VOLTAMETER

VX-022

VOLTAMETER, electrolytic, Hofman, for demonstration of electrolysis of water and dilute acids and measurement of the products of dissociation. With two limbs graduated 50 cm^3 in 0·2 cm^3, two straight bore stopcocks but **without electrodes** ... Each **£6·06** *mx*

ACCESSORIES

VX-023 **Electrodes, platinum,** mounted with stoppers for voltameter VX-022 ... ... Pair **£2·16** *mx*

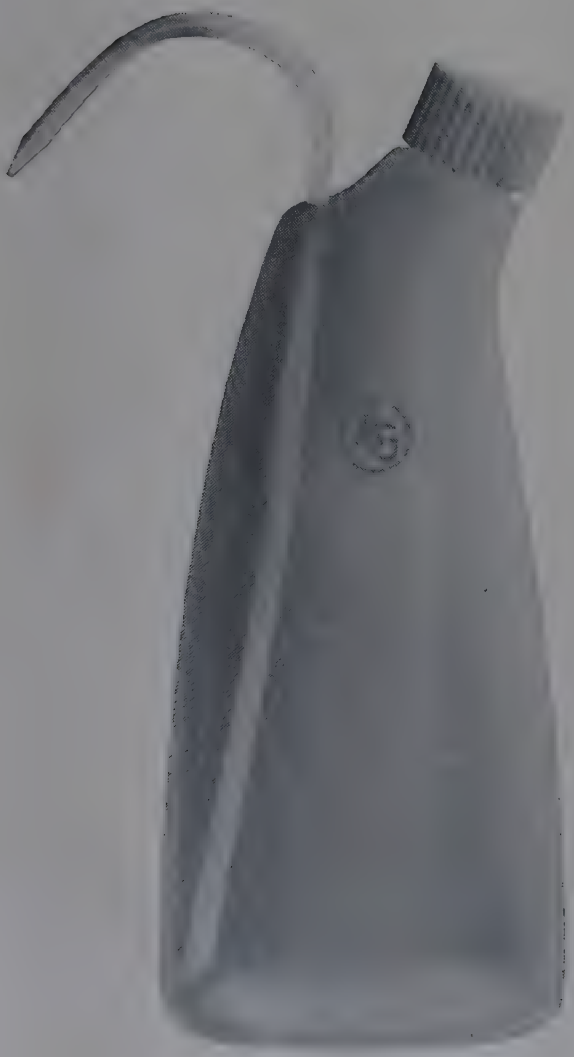
GLASS WASHBOTTLE

WB-040

WASHBOTTLES, Ⓐ, **borosilicate glass,** with rubber stopper and bent tubes, one drawn to a fine jet. Capacity 500 ml ... ... Ten **£7·00** Each **£0·78** *bx*

Gallenkamp POLYTHENE WASHBOTTLES

REGD TRADE MARK



WB-100

A streamlined design of squeeze bottle, easy to handle and control. The white polythene cap seals positively but is readily released. Caps are available in other colours if required for colour coding.

- Translucent wall shows level of contents
- Stand firmly on the bench
- Deliver a powerful, clean jet
- Refill without tilting or removing jet
- Stepped bore for adjusting jet diameter

WB-100

WASHBOTTLES, *Gallenkamp*, **polythene.**

Capacity	250	600 ml	
Ten	**£2·00**	**3·00**	*bx*
Each	**£0·26**	**0·36**	

ACCESSORIES

WB-105 **Caps, coloured polythene,** for colour coding above bottles. In packs of 10 of one colour.

Colour	Red	Yellow	
10 packs	**£1·80**	**1·80**	*bx*
Pack	**£0·25**	**0·25**	

When ordering please state colour required.

WASHING EQUIPMENT

WD-020

BOTTLE RINSER, for rinsing the interiors of bottles with neck diameter between 9·5 mm and 10 cm at an approximate rate of 600/hour. Comprises a spring loaded nozzle mounted on a rigid base supplied with a length of 3-ply hose. The sloping top surface of the distributor is channelled to allow water to flow away and is fitted with four plastics coated sidearms to support larger bottle necks ... ... Each **£14·80** *fx*

ACCESSORY

WD-028 **Nozzle,** for test tubes and syringes, with four plastics coated sidearms ... ... Each **£2·65** *fx*

WD-020

WD-050

WASHING MACHINE, with a quick release chuck taking interchangeable nylon brushes for cleaning syringes, test tubes and round bottles up to 250 ml using water or mild detergent solutions. An extension spindle is supplied for use with the test tube brushes. Mounted on a cast aluminium base with an anti-splash shield, enamelled tray and incorporating a $\frac{1}{16}$ hp motor for 200/250V 50 Hz single phase supplies. Dimensions 63×27×27 cm. **Without brushes** ... ... Each **£95·00** *mx*

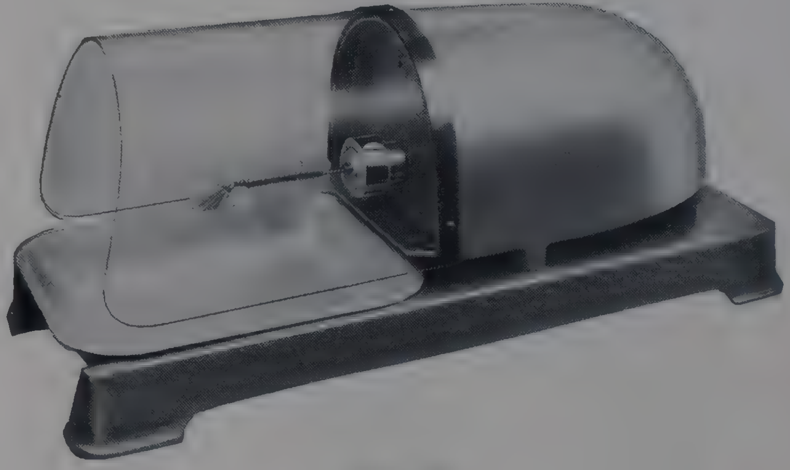
ACCESSORIES

WD-060 **Brushes,** nylon for round bottles.

Bottle capacity	30	120	250 ml	
Ten	**£3·30**	**4·00**	**4·20**	*mx*
Each	**£0·39**	**0·45**	**0·47**	

WD-064 **Brushes,** nylon, for test tubes.

Brush diameter	8	11	14	19	22	25 mm	
Ten	**£2·70**	**2·85**	**2·85**	**2·90**	**2·90**	**3·00**	*mx*
Each	**£0·33**	**0·35**	**0·35**	**0·35**	**0·35**	**0·36**	



WD-050

PIPETTE WASHERS

The washers are a moulded construction which is weld and seam free. The water inlet being at the top minimises the risk of back siphoning even if there is a drop in the water pressure. Will operate with water inputs from 2 to 12 litres/min.

***WD-120**

PIPETTE WASHERS, polythene, automatic siphoning, as specification. Supplied with PVC tubing for water inlet and outlet nozzles, but without basket or soaking jar. Internal diameter 16·5 cm.

For max. pipette length	35	60 cm	
Each	**£16·50**	**19·00**	*mx*

ACCESSORIES

***WD-124** **Basket, polythene,** perforated, with lifting handle. Internal diameter 12·5 cm. Suitable for use with both sizes of washer WD-120 ... ... Each **£5·05** *mx*

WD-126 **Soaking jar, polythene,** moulded construction, weld and seam free.

For max. pipette length Int. dia.	35 15	60 cm 17·5 cm	
Each	**£2·80**	**4·50**	*mx*

WASHING EQUIPMENT

Other items of washing equipment are listed elsewhere in this catalogue as below:

Sink units	see	FX-450 and FX-455
Peg draining racks	see	FY-935 and FY-936
Draining boards	see	FY-938
Draining mat, polythene	see	FY-939

For details and prices see entries in List No. sequence.

WD-120

WD-195

WD-195

DRYING CABINET, maximum temperature approximately 100°C. Comprises stove enamelled aluminium cabinet heated by a plate glass element in the base. Complete with 2 wire mesh shelves, toughened glass sliding doors, indicator lamp, power controller with OFF position and a separate ON/OFF switch.

Overall dimensions 72 × 38 × 49 cm high.
Internal dimensions 70 × 31 × 35 cm high.
Power rating, maximum 625 watts.
For 230/250V a.c. single phase supplies.
Each **£30·30** *fx*

When ordering please state voltage and frequency of supply.

Gallenkamp
REGD TRADE MARK

GLASSWARE DRYERS

For the rapid drying of laboratory glassware; especially items such as cylinders and flasks with narrow necks which are difficult to dry by other means.

The base of each dryer encloses an electrically driven blower. Room air is drawn through a filter, passed through a heater and forced through a perforated apparatus support tube. Both dryers are fitted with safety thermostats to protect them from overheating due to accidental interruption of the air circulation. A switch in the heater circuit enables cold air to be circulated if required.

WD-200

WD-200

GLASSWARE DRYER, *Gallenkamp*, **single point,** as specification, with three interchangeable support tubes of 9·5, 16 and 25 mm outside diameter. Overall height without tube, 28 cm, diameter 24 cm, power rating 200W. For 200/250V 50 Hz supplies. ... ... Each **£35·50** *bx*

REPLACEMENT PART
WD-202 Heating element ... ... Each **£1·70** *bx*

ACCESSORY
WD-205 Flexible tube, 90 cm long for blowing air into large vessels ... ... Each **£2·45** *bx*

WD-215

GLASSWARE DRYER, *Gallenkamp*, **12 point,** as specification, with support tubes 18 mm outside diameter and 23 cm long. Overall height without tubes, 28 cm, diameter 35 cm, power rating 1000W. For 200/250V 50 Hz supplies] ... ... Each **£66·50** *bx*

REPLACEMENT PART
WD-216 Heating element ... ... Each **£3·80** *bx*

ACCESSORY
WD-218 Apparatus support tube, 75 mm long × 11 mm dia. with air outlets at top and sides ... Each **£1·00** *bx*

When ordering please state voltage and frequency of supply

WD-215

Gallenkamp DRYING CABINET
REGD TRADE MARK

- Thermostatically controlled **up to 120°C**
- Outlet for extraction ducting

For full details and prices see OV-880 in List No. sequence.

WASTE BINS

WD-400

WASTE BIN, plastics, fitted with a removable cover for easy emptying. The cover has a rocking flap through which waste material is admitted. Overall dimensions 70 cm high × 32 cm × 32 cm ... ... Each **£3·00** *cx*

ACCESSORY
WD-402 **Liners,** polythene, disposable. In pack of 50. Pack **£1·00** *mx*

WD-425

WASTE BINS, polythene, circular, complete with lid.

Capacity, approx.	35	70	90 litres	
Diameter at top	36	47	48 cm	
Height	38	51	60 cm	
Each	**£2·20**	**3·30**	**3·40**	*cx*

WASTE SACKS AND HOLDERS

The advantage of disposable sack refuse disposal is that when full, the sack is simply detached, taken away, and a clean sack is fitted. The tough, wet-strength sacks listed are particularly easy to handle. Sacks are held by strong metal holders with plastics lids which close over the tops of the fitted sacks.

WD-440

WASTE SACK HOLDER, small size. A free-standing mobile holder with lightweight pedal-operated lid. The tubular stand is finished in white stove enamel and is small enough to slide under laboratory benches. Overall dimensions (lid closed) 29 × 28 × 60 cm high. **Without sacks.** Each **£5·05** *fx*

WD-441

WASTE SACK HOLDER, small size as WD-440. With bracket for wall or bench-end mounting. Including lid but **without sacks** ... ... Each **£2·88** *fx*

ACCESSORIES for WD-440 and WD-441
WD-442 **Waste sacks,** polythene light duty, 60 × 28 cm. Pack of 100 **£1·80** *mx*
WD-444 **Waste sacks,** 1-ply kraft, 60 × 28 cm. Pack of 50 **£1·45** *mx*

WD-450

WASTE SACK HOLDER, large size. With bracket for wall mounting. Overall dimensions 38 × 38 × 94 cm high. Including lid but **without sacks.** Each **£3·58** *fx*

WD-455

WASTE SACK HOLDER, large size as WD-450 but with free-standing mobile frame, white stove enamelled, and pedal operated lid. Overall dimensions 38 × 38 × 97 cm high. **Without sacks** ... ... Each **£6·90** *fx*

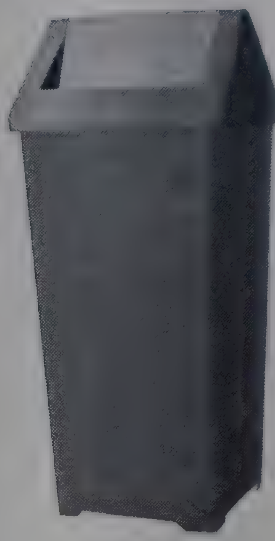
ACCESSORIES for WD-450 and WD-455
WD-458 **Waste sacks,** polythene, 100 × 33 cm. Pack of 100 **£5·00** *mx*
WD-460 **Waste sacks,** 2-ply high wet strength kraft, 100 × 36 × 20 cm ... ... Pack of 50 **£2·85** *mx*

WATCH GLASSES

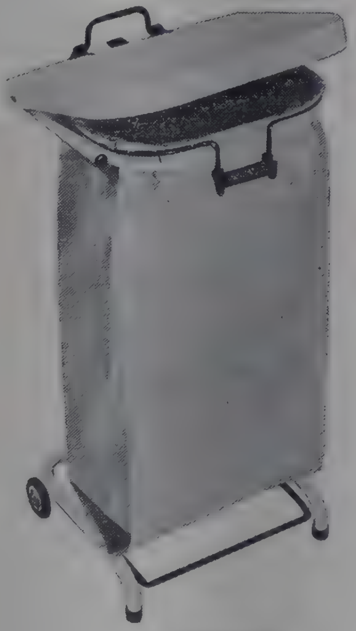
***WE-025**

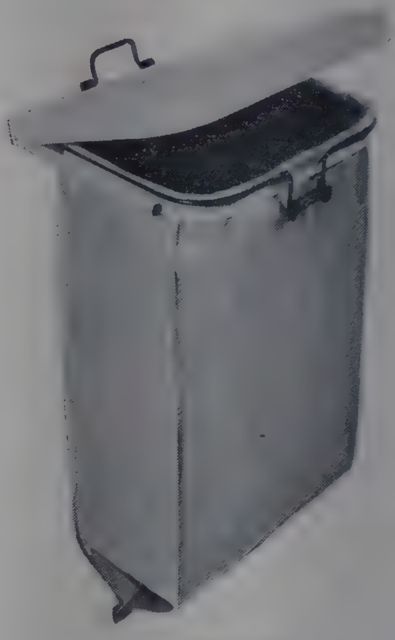
WATCH GLASSES, thin clear glass, edges ground. Supplied in packs of 10.

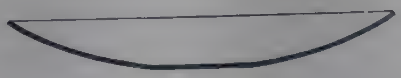
Diameter	5	6·5	7·5	9 cm	
10 packs	**£6·60**	**8·20**	**9·20**	**10·40**	*cx*
Pack	**£0·74**	**0·92**	**1·02**	**1·16**	
Diameter	10	12·5	15	20 cm	
10 packs	**£11·60**	**16·50**	**20·00**	**33·00**	*cx*
Pack	**£1·30**	**1·85**	**2·25**	**3·70**	


WD-400

WD-425


WD-440 with sack
WD-455 with sack

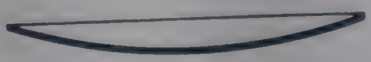

WD-441 with sack
WD-450 with sack


WE-050

***WE-050**

WATCH GLASSES, stout clear glass, with flat polished bottom. Supplied in packs of ten.

Diameter	5	6·5 cm	
10 packs	**£11·20**	**13·20**	*cx*
Packs	**£1·25**	**1·50**	


WE-060

WE-060

WATCH GLASSES, *Pyrex* glass.

Diameter	2·5	5	7·5	10	12·5	15 cm	
Std. pack qty.	36	36	144	144	72	72	
Std. pack	**£10·30**	**10·30**	**47·90**	**52·50**	**30·05**	**35·65**	*jx*
Each	**£ 0·37**	**0·37**	**0·43**	**0·46**	**0·51**	**0·60**	

WATCH GLASSES adjusted to a predetermined weight see BA-974 in List No. sequence.

WATER BATHS

WF-020

WF-040
with WF-042

WF-050

A range of simple water baths, especially suitable for educational use, manufactured of light gauge aluminium for convenience in handling and for rapid heating.

WF-020
WATER BATH, for gas heating, aluminium, 12·5 cm diameter, 9 cm deep. With two handles and set of aluminium rings ... ...Ten **£14·00** Each **£1·55** *bx*

WF-030
WATER BATH, for gas heating, anodised aluminium, 20 cm diameter, 11·5 cm deep. With two plastics heat resisting handles and set of aluminium rings.
Ten **£38·00** Each **£4·20** *bx*

WF-040
WATER BATH, as WF-030 but with constant level device fitted ... ...Ten **£47·00** Each **£5·30** *bx*

ACCESSORY
WF-042 Tripod stand with positioning rim. Suitable for WF-030 and WF-040. Ten £17·00 Each £1·90 *bx*

WF-050
WATER BATH, electrically heated, anodised aluminium, 20 cm diameter, 11·5 cm deep. The 1000W heater incorporates a device which limits its temperature to a safe low value in the event of the bath boiling dry. With constant level device, plastics heat resisting feet and set of aluminium rings. With 3-core cable and connector. For 220/240V a.c. supplies only.
Ten **£78·00** Each **£8·60** *bx*

REPLACEMENT PART
WF-052 Heating element, 1000W, with plug and mains cable.
Each **£3·20** *bx*

Gallenkamp SINGLE PLACE WATER OR STEAM BATHS
WITH BUILT-IN ELECTRIC HEATING

WF-150

WF-190

WF-150
WATER BATH, *Gallenkamp*, cast aluminium alloy, grey stoved enamel finish exterior. Dimensions: internal **20 cm diameter**×14·5 cm deep. With built-in 750W electric heater, constant level device and a set of stainless steel rings WF-290. The heater incorporates a device which limits its temperature to a safe, low value in the event of the bath boiling dry. With 3-core cable and connector. For 220/240V a.c. supplies only
Each **£21·00** *bx*

REPLACEMENT PART
WF-152 Heating element, 750W, with plug and mains cable.
Each **£3·60** *bx*

When ordering please state voltage and frequency of supply.

WF-190
WATER BATH, *Gallenkamp*, tinned spun copper, grey stoved enamel finish exterior. Dimensions: internal **25 cm diameter**×13 cm deep; overall height, 18 cm. With three legs, built-in 1500W electric heater, constant level device and set of concentric copper rings. The heater incorporates a device which limits its temperature to a safe, low value in the event of the bath boiling dry. With 3-core cable and connector. For 220/240V a.c. supplies only. ... ... Each **£25·00** *bx*

REPLACEMENT PART
WF-194 Heating element, 1500W, with plug and mains cable.
Each **£3·50** *bx*

When ordering please state voltage and frequency of supply.

Gallenkamp MULTIPLE PLACE WATER/STEAM BATHS

WITH BUILT-IN ELECTRIC HEATING

WF-200

WATER BATH, *Gallenkamp*, **5-hole,** size 27 × 20 × 10 cm, with 750W electric heater and constant level device. The bath is an aluminium alloy casting finished in grey stoved enamel. The stainless steel cover has circular holes 10·1, 8·5, 6·9 cm and (two) 5·3 cm diameter each fitted with a set of stainless steel rings. The heater incorporates a device which limits its temperature to a safe value in the event of the bath boiling dry. With 3-core cable and connector.

For 220/240V a.c. supplies … …	Each	**£21·00**	*bx*
For 200/210V a.c. supplies … …	Each	**£21·00**	*bxN*
For 110/120V a.c. supplies … …	Each	**£21·00**	*bxN*

When ordering please state voltage.

REPLACEMENT PARTS

WF-152 **Heating element** … } For details and prices see entries in List No. sequence.
WF-290 **Water bath rings** … }

WF-200

Power controllers for adjustment of boiling rate—see EC-750 et seq. in List No. sequence.

WF-220

WATER BATH, *Gallenkamp*, **stainless steel, 6-hole** size 33 × 23 × 10 cm, with 750W electric heater and constant level device. The removable cover has 8·5 cm diameter holes, each fitted with a set of stainless steel rings. The heater incorporates a device which limits its temperature to a safe value in the event of the bath boiling dry. With 3-core cable and connector.

For 220/240V a.c. supplies … …	Each	**£30·00**	*bx*
For 200/210V a.c. supplies … …	Each	**£30·00**	*bxN*
For 110/120V a.c. supplies … …	Each	**£30·00**	*bxN*

When ordering please state voltage.

REPLACEMENT PARTS

WF-152 **Heating element** … } For details and prices see entries in List No. sequence.
WF-290 **Water bath rings** … }

WF-220
(WF-250 is similar in design)

WF-250

WATER BATH, *Gallenkamp*, **stainless steel, 12-hole,** size 46 × 30 × 10 cm, with 1500W electric heater and constant level device. The removable cover has 8·5 cm diameter holes each fitted with a set of stainless steel rings. The heater incorporates a device which limits its temperature to a safe value in the event of the bath boiling dry. With 3-core cable and connector.

For 220/240V a.c. supplies … …	Each	**£37·00**	*bx*
For 200/210V a.c. supplies … …	Each	**£37·00**	*bxN*
For 110/120V a.c. supplies … …	Each	**£37·00**	*bxN*

When ordering please state voltage.

REPLACEMENT PART

WF-252	**Heating element, 1500W** … …	Each	**£3·70**	*bx*

When ordering please state voltage.

REPLACEMENT RINGS for WF-200, WF-220 and WF-250.

WF-290 **Water bath rings,** *Gallenkamp*, **stainless steel; size 1 is the central cover with a knob.**

Size	1	2	3	4	
Ext. dia.	5·1	6·6	8·2	9·9 cm	
Int. dia.	—	3·8	5·3	6·9 cm	
Ten	**£1·70**	**1·80**	**2·40**	**2·70**	*bx*
Each	**£0·24**	**0·25**	**0·31**	**0·33**	

Size	5	6	7	8	
Ext. dia.	11·5	13·3	15·1	17·1 cm	
Int. dia.	8·5	10·1	11·9	13·1 cm	
Ten	**£3·60**	**3·80**	**5·20**	**6·40**	*bx*
Each	**£0·42**	**0·44**	**0·58**	**0·72**	

Gallenkamp

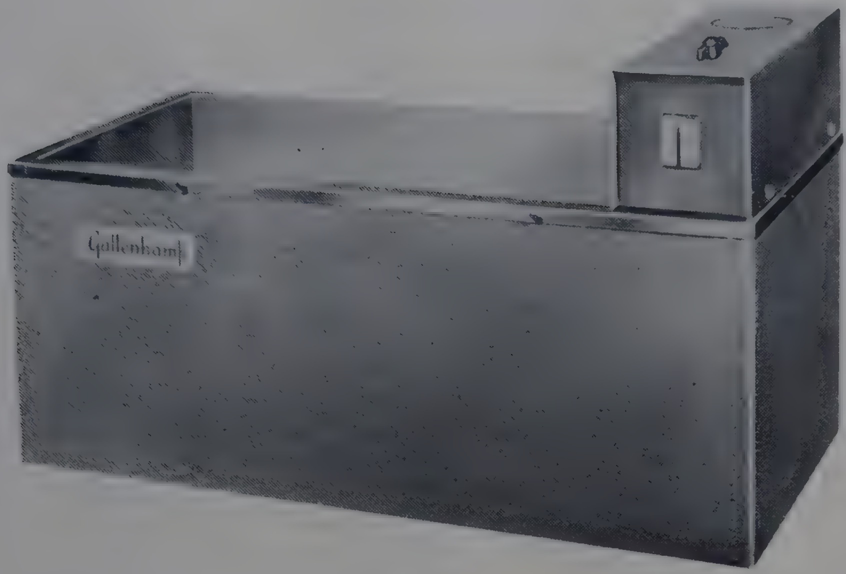
WATER BATHS FOR SOXHLET EXTRACTION

- **Six place for flasks up to 500 ml capacity**
- **Energy regulator control**
- **Built-in constant level**

For full details and prices see EV-100 in List No. sequence.

Gallenkamp GENERAL PURPOSE WATER BATH

10 LITRE CAPACITY



WF-360

- **Direct reading thermostatic control to 100°C**
- **Temperature variation less than 0·1degC**
- **Stainless steel interior**
- **Efficient insulation between bath and outer case**
- **Bath continuously stirred**
- **Accessories include test tube racks, gabled cover, water circulating pump and cooling coil**

CONSTRUCTION

The bath is of stainless steel; the outer case is sheet steel finished in grey stoved enamel. Between them is packed glass fibre insulation. All the controls are mounted in a stainless steel case which bridges one end of the bath. A false bottom ensures efficient water circulation with all bath loads. The immersion heater is metal sheathed.

DIMENSIONS

	Length	Width	Depth
Working space	38 ×	21 ×	14 cm
Overall	50 ×	24 ×	28 cm
Power rating, maximum	1500W		

TEST TUBE RACKS

The bath will accommodate up to 3 racks in the series WF-385 to WF-393.

PERFORMANCE

Temperature range	
Without cover	†Ambient to 50°C
With cover	†Ambient to 100°C

†For operation near or just below ambient temperature cooling coil WF-371 must be fitted and supplied with cold tap water.

Temperature fluctuation	±0·2degC (with water)
Temperature variation	Less than 0·1degC

CONTROLS

The controls comprise a mains on/off switch, load indicator lamp and a *Compenstat* direct reading thermostat scaled 0 to 100°C in 5° subdivisions. The bath liquid is vigorously stirred by an efficient propeller which is driven by a quiet induction motor.

WF-360

WATER BATH, *Gallenkamp*, **10 litre capacity, stainless steel interior,** as specification. With direct reading *Compenstat* control, metal sheathed immersion heater, induction motor stirrer, mains ON/OFF switch and load indicator lamp. For single phase a.c. supplies only.

For 220/240V	Each	**£66·00**	*bx*
For 200/210V	Each	**£67·00**	*bxN*
For 110/120V	Each	**£67·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

WF-363	**Stirrer motor**	Each	**£3·10**	*bx*
WF-365	**Heating element, 1500W**	Each	**£5·70**	*bx*

When ordering replacement parts please state serial number of water bath and supply voltage.

ACCESSORIES FOR WF-360

WF-371

COOLING COIL, *Gallenkamp*, for operating bath near or just below ambient temperature. Clips to side of bath. With nozzles for 8 mm bore flexible tubing.
Each **£9·30** *bx*

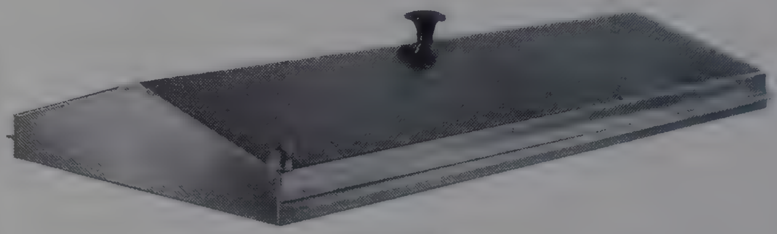
ACCESSORY

TX-750 **Tubing,** neoprene, N8. For price see entry in List No. sequence.

WF-371

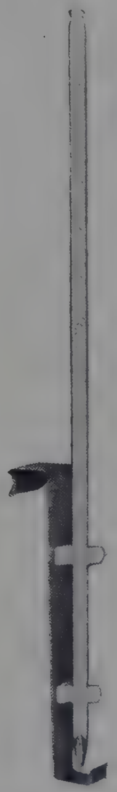
WF-373

GABLED COVER, *Gallenkamp*, stainless steel. Must be used to operate bath above 50°C. ... Each **£8·00** *bx*


WF-373

WF-374

THERMOMETER HOLDER, *Gallenkamp*, for mercury in glass thermometers approx. 6 mm dia. Clips over side of bath. ... ... Each **£1·00** *bx*


WF-374
with thermometer

WF-376

PUMP, *Gallenkamp*, for circulating water from bath to external apparatus. Mounted on stirrer motor drive shaft. Maximum flow 4 litres/min at zero head; maximum head 60 cm. With nozzles for 10 mm bore flexible tubing.
Each **£1·50** *bx*

ACCESSORY

TX-750 **Tubing,** neoprene, N10. For price see entry in List No. sequence.

WF-376

WF-380

SPHERES, polyolefin, 20 mm dia. Used as a floating lid to minimise evaporation and heat losses. In pack of 200 **2 packs cover WF-360 with a single layer.**
Pack **£2·00** *bx*

For illustration see page 740.

Gallenkamp STAINLESS STEEL RACKS FOR TEST TUBES

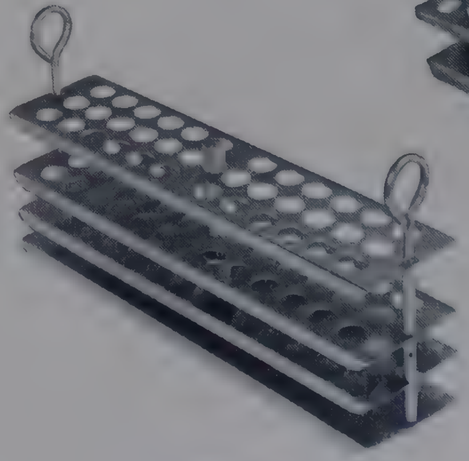
Racks WF-385, WF-387, WF-389 and WF-391 are supplied as packs of separate components for assembly by the user. Spacers are provided which allow the top plate to be set at heights of 40 mm, 60 mm or 80 mm above the base plate.

Rack WF-393 which is supplied factory assembled has a shelf which can be raised or lowered to allow immersion depth of tubes to be varied.

Distance between top plate and shelf is 6 cm max., 3·5 cm min.

Overall dimensions of all racks when assembled 27×7×13 cm high.

List No.	For tubes o.d. mm	No. of holes	Each £	
WF-385	25	16	**3·50**	*bx*
WF-387	19	18	**3·50**	*bx*
WF-389	16	26	**3·50**	*bx*
WF-391	12	36	**3·50**	*bx*
WF-393	12	36	**6·25**	*bx*


WF-393

WF-391
(WF-385 to WF-389 are similar)

Gallenkamp GENERAL PURPOSE WATER BATH

15 LITRE CAPACITY

Gallenkamp

WF-400 with IH-360

- **Stainless steel interior**
- **Stoved enamel outer case**
- **High efficiency glass fibre insulation**
- **Maximum temperature 100°C**
- ***Compenstat* (solid state) temperature control**
- **Sheathed heater outside working space**
- **Accessories include test tube racks, gabled cover, adjustable shelf and cooling coil**

PERFORMANCE

Temperature range
Without cover †Ambient to 50°C
With cover †Ambient to 100°C
†For operation near or just below ambient temperature cooling coil WF-404 must be fitted and supplied with cold tap water.

Temperature fluctuation ±0·05degC
Temperature variation ±0·1deg C

CONTROLS

The controls are grouped in a compartment at one end of the bath and include the mains ON/OFF switch, load indicator lamp and the *Compenstat* (solid state) direct reading thermostat, scaled 0 to 100°C in 5degC subdivisions.

DIMENSIONS

	Length		Width		Depth
Working space	35	×	30	×	16 cm
Overall	50	×	40	×	22 cm
Power rating, maximum	500W				

TEST TUBE RACKS

The bath will accommodate up to 5 racks in the series WF-385 to WF-393.

NOTE: WF-400 can be converted to a metabolic shaking incubator IH-350 after purchase. Quotation for set of additional parts and fitting instructions on request.

WF-400

WATER BATH, *Gallenkamp*, **15 litre capacity, stainless steel interior,** as specification. With direct reading *Compenstat* (solid state) control, metal sheathed heater, mains ON/OFF switch and load indicator lamp. For single phase a.c. supplies only.

For 200/240V	Each	**£88·00**	*bx*
For 200/210V	Each	**£88·00**	*bxN*
For 110/120V	Each	**£88·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

WF-402	**Heater,** 500W	Each	**£4·35**	*bx*

When ordering replacement part please state serial number of water bath and supply voltage.

ACCESSORIES

IH-360	**Cover,** stainless steel, gabled to drain condensation to sides of bath. For price see entry in List No. sequence.			
WF-404	**Cooling coil,** to clip over side of bath. With connections for 8 mm bore flexible tubing	Each	**£12·50**	*bx*
WF-406	**Thermometer holder,** stainless steel, clipping on side of bath	Each	**£1·10**	*bx*
WF-408	**Shelf, adjustable**	Each	**£9·60**	*bx*
TJ-440	**Thermometer,** scale span 0 to 110°C.	For prices see entries in List No. sequence.		
WF-380	**Spheres,** to minimise evaporation and heat losses. 2 packs required ...			

WF-385	**Rack,** to hold 25 mm dia. tubes ...	For details and prices see entries in List No. sequence.
WF-387	**Rack,** to hold 19 mm dia. tubes ...	
WF-389	**Rack,** to hold 16 mm dia. tubes ...	
WF-391	**Rack,** to hold 12 mm dia. tubes ...	
WF-393	**Rack,** to hold 12 mm dia. tubes, with adjustable shelf	

Gallenkamp GENERAL PURPOSE WATER BATH

30 LITRE CAPACITY

- **Stainless steel interior**
- **Stoved enamel outer case**
- **High efficiency glass fibre insulation**
- **Maximum temperature 100°C**
- *Compenstat* **(solid state) temperature control**
- **Fitted shelf adjustable for height**
- **Sheathed heater mounted below perforated shelf**
- **Accessories include test tube racks, gabled cover, cooling coil and constant level**

WF-455 with WF-458 and WF-460

DIMENSIONS

	Length		Width		Depth
Working space	43	×	30	×	20 cm
Overall	64	×	41	×	27 cm
Power rating, maximum	1500W				

TEST TUBE RACKS

The bath will accommodate up to 6 racks in the series WF-385 to WF-393.

PERFORMANCE

Temperature range

Without cover	†Ambient to 50°C
With cover	†Ambient to 100°C

†For operation near or just below ambient temperature cooling coil WF-459 must be fitted and supplied with cold tap water.

Temperature fluctuation	±0·15degC
Temperature variation	±0·1degC

CONTROLS

The controls are grouped in a compartment at one end of the bath and include the mains ON/OFF switch, load indicator lamp and the *Compenstat* (solid state) direct reading thermostat, scaled 0 to 100°C in 5degC subdivisions.

WF-455

WATER BATH, *Gallenkamp*, **30 litre capacity, stainless steel interior,** as specification. With direct reading *Compenstat* (solid state) control, metal sheathed heater, perforated shelf the height of which can be adjusted in 2·5 cm steps, mains ON/OFF switch and load indicator lamp. For single phase a.c. supplies only.

For 220/240V	Each	**£118·00**	*bx*
For 200/210V	Each	**£130·00**	*bxN*
For 110/120V	Each	**£130·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PART

WF-456	**Heater,** 1500W	Each	**£5·00**	*bx*

When ordering replacement parts please state serial number of water bath and supply voltage.

ACCESSORIES

WF-458	**Cover,** stainless steel, gabled to drain condensation to sides of bath, with handle and tubulure for insertion of thermometer	Each	**£14·00**	*bx*
WF-459	**Cooling coil,** fixing to side of bath. With connections for 8–9 mm bore flexible tubing ...	Each	**£11·60**	*bx*
WF-460	**Constant level device**	Each	**£6·70**	*bx*
TJ-440	**Thermometer,** scale span 0 to 110°C.	For prices see entries in List No. sequence.		
WF-380	**Spheres,** to minimise evaporation and heat losses. 3 packs required ...			
WF-406	**Thermometer holder**			

WF-385	**Rack,** to hold 25 mm dia. tubes ...	For details and prices see entries in List No. sequence
WF-387	**Rack,** to hold 19 mm dia. tubes ...	
WF-389	**Rack,** to hold 16 mm dia. tubes ...	
WF-391	**Rack,** to hold 12 mm dia. tubes ...	
WF-393	**Rack,** to hold 12 mm dia. tubes, with adjustable shelf	

Gallenkamp GENERAL PURPOSE WATER BATH

70 LITRE CAPACITY

WF-470 with WF-476

- Stainless steel interior
- Stoved enamel outer case
- High efficiency glass fibre insulation
- Maximum temperature 95°C
- Contact thermometer temperature control
- Fitted shelf adjustable for height
- Sheathed heater mounted below perforated shelf
- Accessories include test tube racks, gabled cover, cooling coil and constant level

PERFORMANCE

Temperature range

Without cover	†Ambient to 50°C
With cover	†Ambient to 95°C

†For operation near or just below ambient temperature cooling coil IH-392 must be fitted and supplied with cold water.

Temperature fluctuation	±0·1degC
Temperature variation	±0·1degC

CONTROLS

All controls, comprising the adjustable contact thermometer, transistorised relay and three heat switch, are grouped at one end of the bath. The three heat switch with OFF position enables the power input to the bath to be set to 500, 1000 or 2000 watts to provide rapid heating and optimum control at the set temperature. Mains and load indicator lamps and a tubulure for an indicating thermometer are fitted.

DIMENSIONS

	Length		Width		Depth
Working space	60	×	46	×	28 cm
Overall	84	×	56	×	33 cm
Power rating, maximum	2000W				

TEST TUBE RACKS

The bath will accommodate up to 12 racks in the series WF-385 to WF-393.

WF-470

WATER BATH, *Gallenkamp*, **70 litre capacity, stainless steel interior,** as specification. With adjustable contact thermometer, transistorised relay, perforated stainless steel shelf the height of which can be adjusted in 2·5 cm steps, three heat switch, mains and load indicator lamps. For single phase a.c. supplies only.

For 220/240V	Each	**£148·00** *bx*
For 200/210V	Each	**£149·00** *bxN*
For 110/120V	Each	**£149·00** *bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

WF-472	**Heater,** 1000W, inner	Each	**£6·20** *bx*
WF-474	**Heater,** 1000W, outer	Each	**£6·20** *bx*
TM-866	**Contact thermometer,** 0 to 100°C. For prices see entry in List No. sequence.		

When ordering replacement parts please state serial number of water bath and supply voltage.

ACCESSORIES

WF-476	**Cover, gabled,** stainless steel	Each £22·60 *bx*
WF-460	**Constant level device**	For details and prices see entries in List No. sequence
1H-392	**Cooling Coil**	
TJ-440	**Thermometer,** 0 to 110°C	
WF-380	**Spheres,** to minimise evaporation and heat losses. 5 packs required ...	

WF-385	**Rack,** to hold 25 mm dia. tubes ...	For details and prices see entries in List No. sequence.
WF-387	**Rack,** to hold 19 mm dia. tubes ...	
WF-389	**Rack,** to hold 16 mm dia. tubes ...	
WF-391	**Rack,** to hold 12 mm dia. tubes ...	
WF-393	**Rack,** to hold 12 mm dia. tubes, with adjustable shelf	

Gallenkamp REFRIGERATED THERMOSTATIC BATHS

35 LITRE CAPACITY

- **Temperature range −20 to +50°C**
- **Contact thermometer control**
- **Stainless steel interior**
- **Internal depth 23 cm**
- **Fitted shelf adjustable for height**
- **Available with pump for circulating cooled liquid to external apparatus**
- **Suitable for maturing jelly samples at 10°C as required by BS 647 and BS 757**

Gallenkamp

WF-720

PERFORMANCE

Temperature range (in ambient of 25°C)	−20°C to 50°C
Temperature fluctuation	±0·5degC

CONTROLS

Temperature is controlled by a contact thermometer which actuates a transistorised relay in the heater supply circuit. Below ambient temperature, the refrigerator is operated continuously. The bath liquid (which can be water, aqueous ethylene glycol or light oil, depending on operating temperature) is vigorously and noiselessly stirred by an induction motor driven high efficiency propeller.

CONSTRUCTION

The apparatus comprises an upper section containing the bath and controls, supported on a plinth which houses the refrigerator. This outer case is finished in grey stoved enamel and is mounted on smoothly running castors. The interspace between the outer case and the bath is filled with rigid polyurethane foam insulation and is vapour sealed. Across one end of the bath is a bridge which houses the electrical controls and supports the heater, cooling coil, stirrer and contact thermometer. The bath is fitted with a hinged, easily raised lid and a perforated stainless steel shelf, the height of which can be adjusted to suit the work load.

DIMENSIONS

	Length	Width	Depth
Working space	43 ×	36 ×	23 cm
Overall	69 ×	61 ×	86 cm
Power rating, maximum	850W		
Net weight, approx.	65 kg		

WF-720

COOLED THERMOSTATIC BATH, *Gallenkamp*, **35 litre capacity,** as specification, with refrigerator, transistorised relay, contact thermometer, stirrer and motor, adjustable shelf and hinged cover. For single phase a.c. supplies only.

For 220/240V	Each	**£349·00**	*bx*
For 200/210V	Each	**£365·00**	*bxN*
For 110/120V	Each	**£365·00**	*bxN*

When ordering please state voltage and frequency of supply.

WF-721

COOLED THERMOSTATIC BATH, *Gallenkamp*, **35 litre capacity,** as WF-720 but **with built-in pump** to circulate bath fluid to external apparatus at rates between 11·5 l/min at zero head and 2 l/min at 160 cm head. For single phase a.c. supplies only.

For 220/240V	Each	**£415·00**	*bx*
For 200/210V	Each	**£431·00**	*bxN*
For 110/120V	Each	**£431·00**	*bxN*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

WF-724	**Heating element ... ...**	Each	**£3·60**	*bx*
WF-725	**Stirrer motor ... ...**	Each	**£5·75**	*bx*
WF-726	**Contact thermometer, range −38°C to +50°C.**	Each	**£9·00**	*bx*

When ordering replacement parts please state serial number of bath and supply voltage.

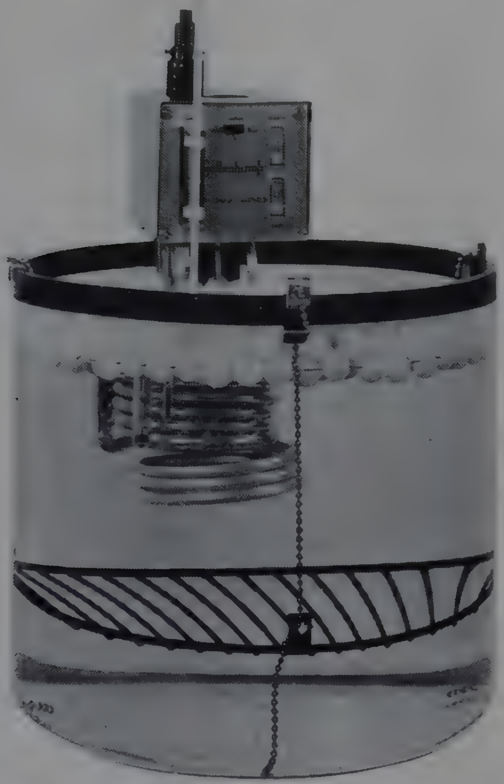
ACCESSORY

LX-110 **Lubricant, for fan motor bearings. For price see entry in List No. sequence.**

Gallenkamp THERMOSTATIC WATER BATH

20 LITRE CAPACITY

- Borosilicate glass tank
- Maximum temperature 90°C
- Internal depth 30 cm



WF-850 with accessories and spheres WF-380

PERFORMANCE

Temperature range	Ambient to 90°C For use above 50°C a floating lid of spheres WF-380 should be used. For use near ambient cooling coil TM-870 must be fitted and supplied with cold water.
Temperature fluctuation	±0·05degC
Temperature variation	±0·1degC

CONSTRUCTION

This water bath is an assembly comprising

WF-855	Borosilicate glass tank with rubber covered rim.
TM-860	Thermo Stirrer with 0 to 100°C contact thermometer and solid state switching, 3-power heater and motor driven stirrer

DIMENSIONS

Tank, internal	34 cm dia. × 30 cm deep		
Tank with Thermo Stirrer and contact thermometer fitted, overall	H	W	D
	50 ×	42 ×	43 cm

- Control by Thermo Stirrer with contact thermometer and solid state switching
- Vigorous agitation without vortexing
- Accessories include adjustable shelf, scaffold rod fixings, equipment for viscometry and circulating pump

WF-850

WATER BATH, 20 litre capacity, *Gallenkamp*, as specification comprising WF-855 glass tank and TM-860 Thermo Stirrer. For single phase supplies.

For 220/240V 50 Hz	Each	**£80·00**	*bx*
For 200/210V 50 Hz	Each	**£80·50**	*bx*
For 110/120V 60 Hz	Each	**£80·50**	*bx*

When ordering please state voltage and frequency of supply.

REPLACEMENT PARTS

WF-855	**Tank,** borosilicate glass with rubber covered rim.	Each **£25·00** *mx*
TM-864	**Heating element,** 1000W	For details and prices see entries in List No. sequence.
TM-866	**Contact thermometer,** range 0 to 100°C	
WF-363	**Stirrer motor**	

When ordering replacement parts please state serial number of Thermo Stirrer and supply voltage.

ACCESSORIES

WF-860	**Wire shelf, plastics coated,** adjustable, including three ball chains and fittings	Each **£8·90** *bx*
WF-864	**Support rod,** 5 cm × 12·7 mm dia., with clamp to fit rim of bath...	Each **£2·30** *bx*
WF-866	**Support plate,** with three 2 in diameter holes to accommodate viscometer holders VS-630 to VS-634. **Requires two support rods WF-864 for mounting.**	Each **£7·80** *bx*
TM-844	**Retort rod mount** ...	
TM-870	**Cooling coil**	For details and prices see entries in List No. sequence.
TM-872	**Holder,** for mercury in glass thermometer	
TM-874	**Heater,** 1500W	

When ordering please state serial number of Thermo Stirrer and supply voltage.

WF-376	**Pump,** for circulating water to external apparatus ...	For details and prices see entries in List No. sequence.
WF-380	**Spheres,** to minimise evaporation and heat losses. 2 packs required	
TJ-102	**Thermometer,** to BS 1704, GP 105C/0·5/100, suitable for measuring the water bath temperature	
VS-630	**Viscometer holder** ...	
VS-632	**Viscometer holder** ...	
VS-633	**Viscometer holder** ...	
VS-634	**Viscometer holder** ...	

Gallenkamp WATER DETERMINATION APPARATUS

TO IP 74 and BS 756

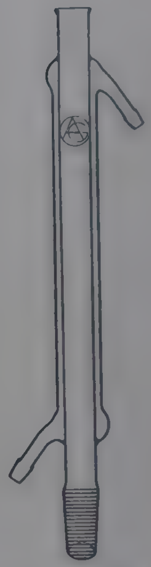
For determination of water content by Dean and Stark method

WJ-130

CONDENSER, Ⓐ, **borosilicate glass,** to BS 756 Fig. 3 and IP 74, jacket length 400 mm, with 19/26 cone.
Ten **£14·40** Each **£1·60** *ax*

WJ-135

SPRAY TUBE, Ⓐ, to BS 756 Fig. 4.
Ten **£3·70** Each **£0·43** *ax*



WJ-130

BOROSILICATE GLASS RECEIVERS

WJ-150

RECEIVER, *Technico,* **Type 1,** to BS 756 Fig. 5, capacity 2 cm^3 subdivided in 0·05 cm^3. With 24/29 cone and 19/26 socket ... ... Ten **£22·50** Each **£2·50** *ax*

WJ-160

RECEIVER, *Technico,* **Type 1,** to BS 756 Fig. 6, capacity 7·5 cm^3 subdivided in 0·1 cm^3, With 24/29 cone and 19/26 socket ... Ten **£24·00** Each **£2·65** *ax*

WJ-170

RECEIVER, *Technico,* **Type 1,** to BS 756 Fig. 7, capacity 10 cm^3 subdivided in 0·1 cm^3. With oblique bore stop-cock, 24/29 cone and 19/26 socket.
Ten **£32·00** Each **£3·60** *ax*

WJ-175

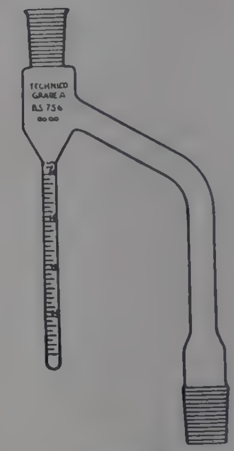
RECEIVER, *Technico,* to ASTM D95, capacity 10 cm^3 subdivided in 0·1 cm^3 to 1 cm^3 and 0·2 cm^3 from 1 to 10 cm^3. With 24/29 cone and 19/26 socket.
Ten **£33·00** Each **£3·70** *ax*

WJ-180

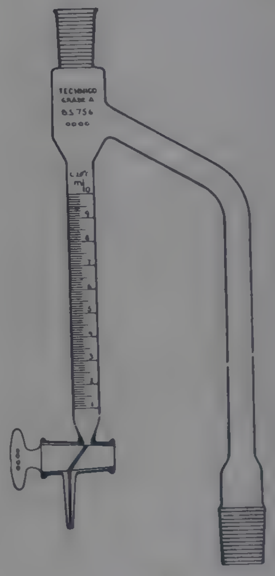
RECEIVER, *Technico,* **Type 1,** to BS 756 Fig. 8, capacity 25 cm^3 subdivided in 0·2 cm^3. With 24/29 cone and 19/26 socket ... ... Ten **£32·00** Each **£3·60** *ax*

WJ-230

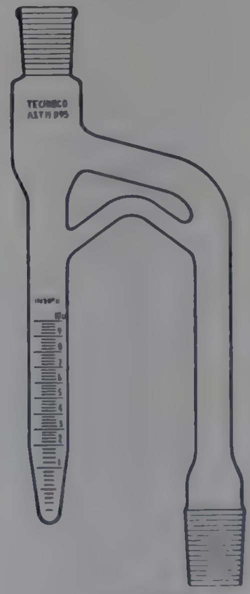
RECEIVER, *Technico,* **Type 2,** to BS 756 Fig. 12, capacity 12·5 cm^3 subdivided in 0·1 cm^3. With 24/29 cone and 19/26 socket ... Ten **£30·00** Each **£3·30** *ax*



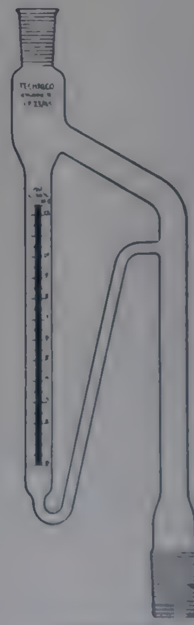
WJ-150
(WJ-160 and WJ-180 are similar)



WJ-170



WJ-175



WJ-230

ACCESSORIES FOR DEAN AND STARK APPARATUS

DISTILLATION FLASK	see Q-FR 500/3S under QUICKFIT
FLASK HEATER, gas	see BX-020 et seq.
or	
FLASK HEATER, electric	see HD-500 and HD-505
RETORT STANDS AND CLAMPS	see SM-430 to SM-610
TUBING	see TX-520, N6·5

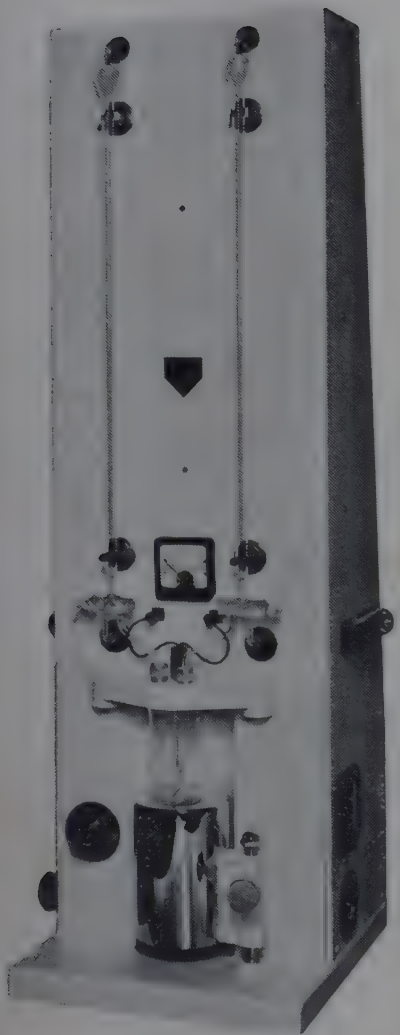
For details and prices see entries in List No. sequence.

WATER DETERMINATION APPARATUS

For determinations of water content by Karl Fischer method

MAINS OPERATED
KARL FISCHER APPARATUS
to BS 2511

- **Magnetic stirring of titration vessel contents**



WJ-450

WJ-450

KARL FISCHER APPARATUS, *BTL*, to BS 2511, for the determination of moisture. Comprising two 25 cm³ burettes, two reagent reservoirs and filling funnels, guard tubes, vacuum control stopcock, glass titration vessel, magnetic stirring, twin platinum electrode, micro-ammeter and nitrogen drying nozzles. In metal cabinet. Overall dimensions 91H × 28W × 32D cm.

For 110/120, 200/220 or 230/250V 50/60 Hz supplies. **Without chemicals** ... ... Each **£240·00** *fxN*

REPLACEMENT PARTS

WJ-454	**Titration vessel,** without electrode ...	Each	**£1·64** *fxN*
WJ-456	**Twin platinum electrode**	Each	**£5·75** *fxN*
WJ-458	**Burette,** 25 cm³, right side	Each	**£5·57** *fxN*
WJ-459	**Burette,** 25 cm³, left side	Each	**£5·57** *fxN*

ACCESSORIES

WJ-462	**Titration vessel,** with side tube for filling and rubber cap	Each	**£2·42** *fxN*
WJ-463	**Titration vessel,** as WJ-462 but with draining tube and stopcock	Each	**£4·79** *fxN*

BATTERY OPERATED
KARL FISCHER APPARATUS

- **Stirring of titration vessel contents by stream of dry nitrogen**

WJ-480

WJ-480

KARL FISCHER APPARATUS, *T & M*, for the determination of moisture. Comprising 25 cm³ burette, twin platinum electrode, titration vessel, drying bottles clips for 500 ml reagent bottle, potentiometer and micro-ammeter. On stand. Overall dimensions 95H × 31W × 25D cm. Battery operated. **Without chemicals.**

Each **£56·40** *fx*

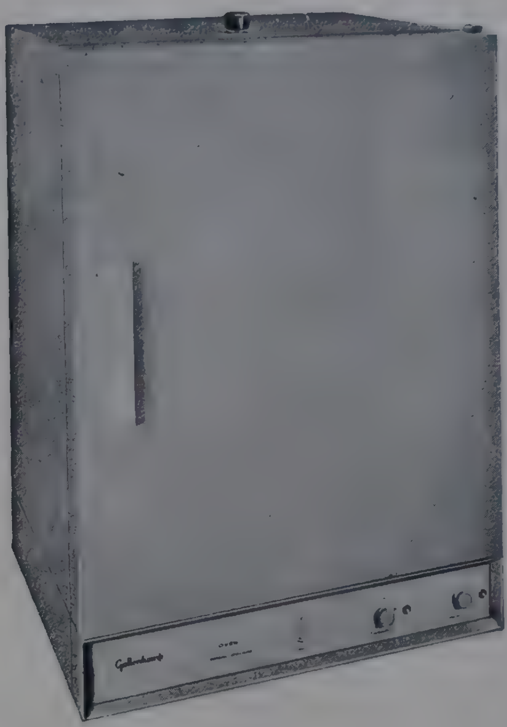
REPLACEMENT PARTS

WJ-484	**Titration vessel,** without electrode ...	Each	**£5·65** *fx*
WJ-486	**Twin platinum electrode,** in glass sheath.	Each	**£2·00** *fx*
WJ-488	**Burette,** 25 cm³	Each	**£2·80** *fx*

WATER DETERMINATION APPARATUS

Gallenkamp
REGD TRADE MARK

MOISTURE EXTRACTION OVEN

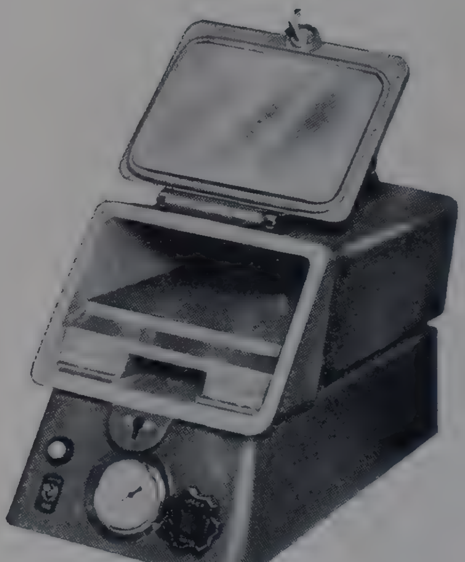


- **Temperature range 40 to 250°C**
- **Capacity 210 litres**
- **Stainless steel interior**
- **Forced ventilation and large heater for rapid drying**

For details and prices see OV-440 in List No. sequence.

Gallenkamp
REGD TRADE MARK

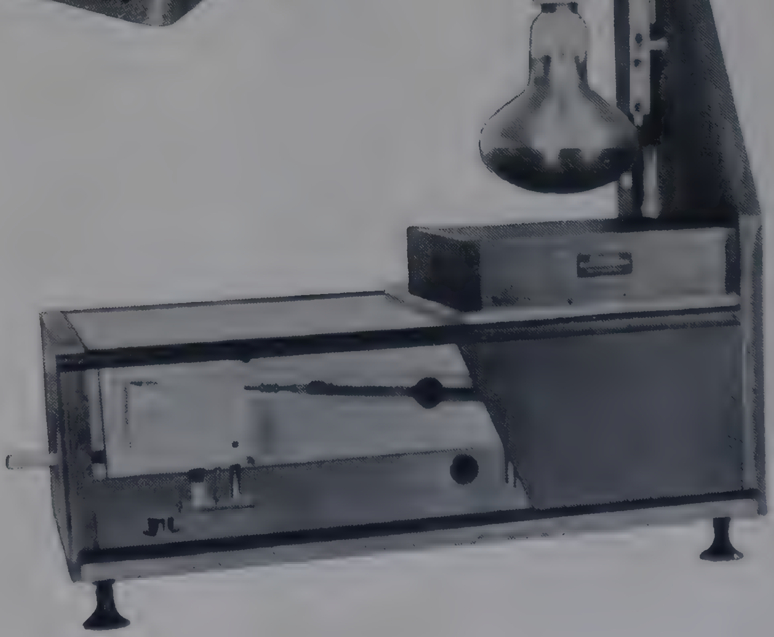
VACUUM DRYING OVEN



- **Temperature range 50 to 140°C**
- **Capacity 4 litres**
- **Integral vacuum tap and gauge**

For details and prices see MV-600 in List No. sequence.

INFRARED MOISTURE BALANCE



- **Direct reading of moisture loss**
- **Magnetically damped beam**
- **Requires approx. 2 g sample**

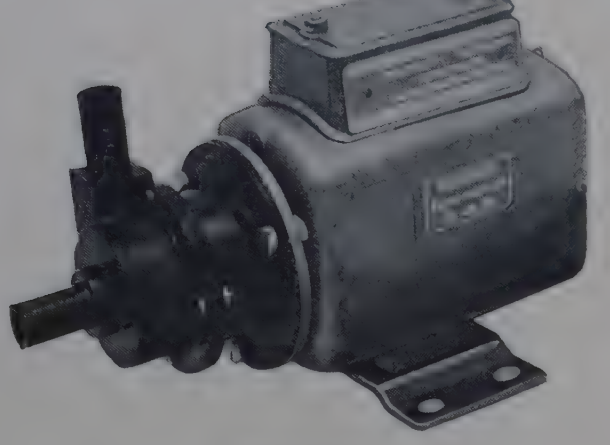
For details and price see MV-640 in List No. sequence.

OV-010 et seq	General purpose drying ovens
OV-930	Vacuum ovens
HV-010	Hygrometers
TK-150 et seq	Thermohygrographs

For details and prices see entries in List No. sequence.

WATER PUMPS

BENCH MOUNTING



WM-050

WM-050

PUMP, water, centrifugal, driven by a series wound motor. Suitable for pumping water at temperatures between 20 and 90°C. With nylon filled phenolic resin pump body, impeller and tubulures, neoprene seal, rubber gasket and stainless steel driving shaft.

Flow at zero head	22 litres/min
Flow at 200 cm head	18 litres/min
Maximum head	600 cm
Tubulures	inlet and outlet 12·5 mm o.d.
Motor rating	up to 4 hours continuous running
Overall dimensions	21 × 9 × 11 cm high

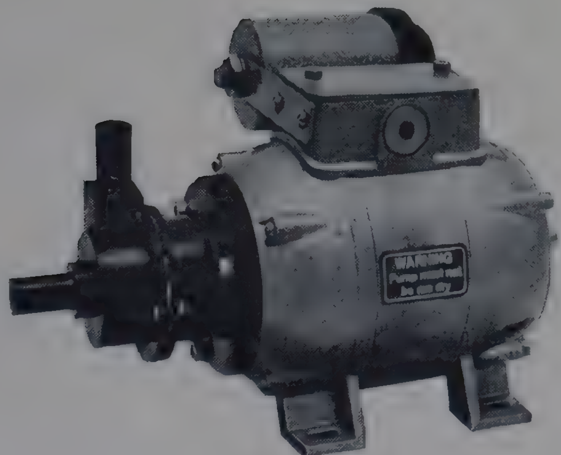
For 220/240V 50/60 Hz single phase supplies.
Complete with terminal box and length of 3-core cable.
Pump must be primed before use ... Each **£14·80** *fx*

WM-054

WM-054

PUMP, water, centrifugal, construction and performance as WM-050 but fitted with an adjustable rheostat to control flow rate and mounted in a splashproof aluminium carrying case. Overall dimensions 32 × 14 × 18 cm high.

For 220/240V 50/60 Hz single phase supplies.
Complete with terminal box and length of 3-core cable.
Pump must be primed before use ... Each **£28·60** *fx*



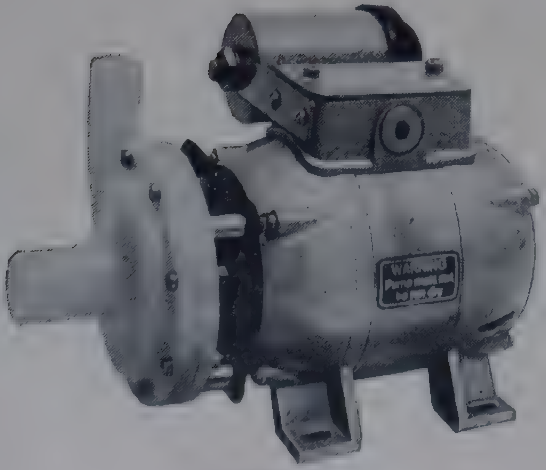
WM-080

WM-080

PUMP, water, centrifugal, driven by a constant speed permanent capacitor motor. Suitable for pumping water at temperatures between 20 and 90°C. With nylon filled phenolic resin pump body, impeller and tubulures, neoprene seal, rubber gasket and stainless steel driving shaft.

Flow at zero head	11 litres/min
Flow at 100 cm head	8 litres/min
Maximum head	200 cm
Tubulures	inlet and outlet 12·5 mm o.d.
Motor rating	continuous
Overall dimensions	23 × 11 × 12 cm high

For 220/240V 50 Hz single phase supplies.
Complete with fitted capacitor, terminal box and length of 3-core cable. Pump must be primed before use.
Each **£16·20** *fx*



WM-084

WM-084

PUMP, water, centrifugal, similar to WM-080 but with polypropylene body, impeller and tubulures, neoprene seal and stainless steel shaft.

Flow at zero head	30 litres/min
Flow at 300 cm head	25 litres/min
Maximum head	550 cm
Tubulures	inlet 25 mm o.d. outlet 19 mm o.d.
Motor rating	continuous
Overall dimensions	21 × 11 × 13 cm high

For 220/240V 50 Hz single phase supplies.
Complete with fitted capacitor, terminal box and length of 3-core cable. Pump must be primed before use.
Each **£19·20** *fx*

WATER AND CHEMICAL PUMPS

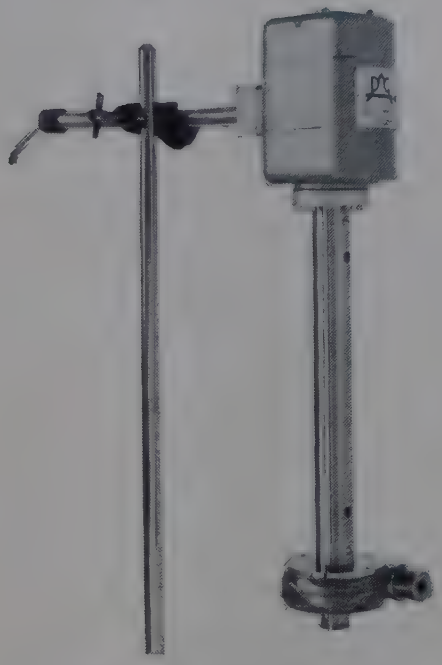
IMMERSION

WM-165

PUMP, water and chemical, centrifugal immersion, driven by a series wound motor. Immersed parts are stainless steel and ptfe. Suitable for pumping a wide range of materials and solvents, at temperatures between 20 and 120°C. Can be dismantled for cleaning.

Water flow, zero head	25 litres/min
Water flow, 200 cm head	15 litres/min
Maximum head	400 cm water
Immersion depth	24 cm
Pump head diameter	11 cm
Outlet diameter	2 cm
Motor rating	up to 4 hours continuous running

For 220/240V 50 Hz single phase supplies. With 3-core cable and 12·5 mm dia. rod for bosshead mounting.
Each **£48·00** *mx*



WM-165 with bosshead and retort rod (WM-170 is similar)

WM-170

PUMP, water and chemical, centrifugal immersion, construction, pump head and outlet diameters as WM-165 but driven by an induction motor.

Water flow, zero head	20 litres/min
Water flow, 200 cm head	10 litres/min
Maximum head	300 cm water
Immersion depth	28 cm
Motor rating	continuous

For 200/250V 50 Hz single phase supplies. With 3-core cable and 12·5 mm dia. rod for bosshead mounting.
Each **£57·00** *mx*

WM-175 with bosshead and retort rod

WM-175

PUMP, water and chemical, centrifugal immersion, construction and performance similar to WM-170 but designed to pump liquefied gases at temperatures down to −150°C. A heat break in the shaft minimises heat transfer between pump and motor. For 200/250V 50 Hz single phase supplies. With 3-core cable and 12·5 mm dia. rod for bosshead mounting. ... Each **£76·00** *mx*

CARBOY PUMPS AND SYPHONS

For details and prices see CC-932 to CC-945 in List No. sequence.

GENERAL PURPOSE PERISTALTIC

***WM-200**

PUMP, water and chemical, peristaltic two roller self priming pattern. For use with flexible tubings, maximum o.d. 13 mm wall thickness at least 1·5 mm. Maximum speed of rotation 500 rev/min. A water flow rate of 4 l/min at 300 cm head can be achieved using tubing TX-805 8 mm bore and a speed of 350 rev/min. With detachable foot for bench mounting, 12 mm dia. rod for bosshead mounting, and two pulleys 5 cm and 14 cm dia. for fitting to pump spindle. Without motor drive, motor pulley, V-belt or flexible tubing.
Each **£19·00** *mx*

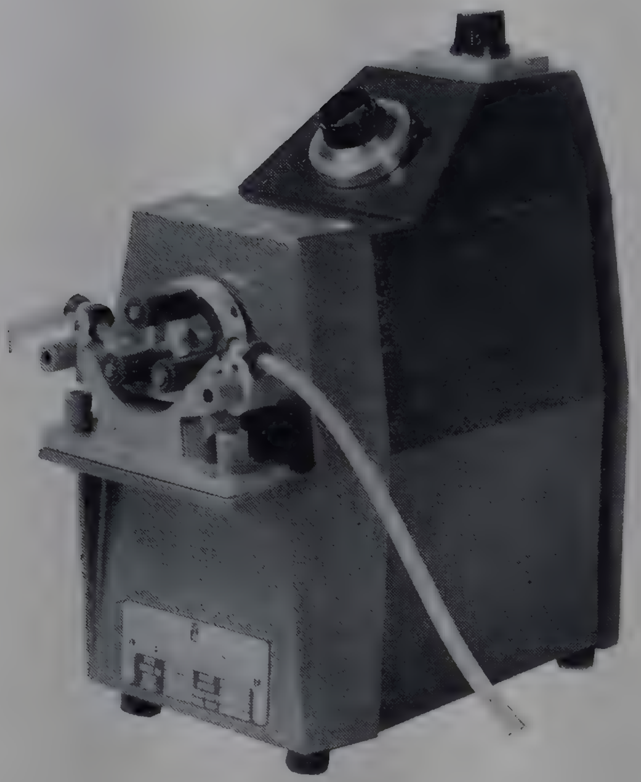
ACCESSORIES

WM-202	**V-belt,** 60 cm circumference	Each £0·60 *cx*
SS-510	**Multispeed motor**	For details and prices see entries in List No. sequence.
MX-720	**Pulley,** size 1 to fit SS-510 shaft...	
TX-805	**Tubing,** silicone rubber, 8 mm bore	

WM-200

Dosing and Metering Peristaltic Pumps see overleaf.

PERISTALTIC WATER AND CHEMICAL PUMPS



WM-250

WM-260 with WM-290

DOSING AND METERING

For pumping, dosing and metering a wide range of fluids including sterile and corrosive ones. The standard pumps WM-250 and WM-260 use an elastic tube clipped to a curved track which is mounted concentrically with a rotor having three rollers. Rotation of the rollers flattens the tube against the track and these flats move the contents along the tube by positive displacement. As the tube recovers, the suction created draws more fluid into the tube.

The multichannel accessories WM-290 and WM-295 have △ section rotors round which the tube elements are wrapped so as to kink at 3 points of small radius. The rotor action within the loop of tubing moves the kinks along to provide positive displacement of the contents.

WM-250

PUMP, water and chemical, peristaltic metering, *Watson-Marlow* **Model MHRE/200.** A single channel pump accepting flexible tubing from 0·5 to 8·0 mm bore of wall thickness 1·6 mm. A speed control provides infinitely variable adjustment from approx. 4 to 200 rev/min. Direction of rotation is reversible. A polarised socket is provided for remote control of speed. The minimum flow rates are about 1/25 of the approx. maximum figures given below.

Tube bore	0·6	1	1·5	2	3	4	6	8 mm
Flow, max.	10	20	40	80	190	300	500	800 ml/min

This pump is **not** suitable for use with multichannel accessories **WM-290 and WM-295.** For 200/250V 50 Hz single phase supplies. **Requires but does not include flexible tubing of 1·6 mm wall.** ... Each **£104·50** *fxN*

WM-260

PUMP, water and chemical, peristaltic metering, *Watson-Marlow* **Model MHRE/7.** As WM-250 but with maximum speed approx. 7 rev/min providing a range of approx. maximum flow rates as follows.

Tube bore	0·6	1	1·5	2	3	4	6	8 mm
Flow, max.	0·3	0·6	1·5	2·5	6	10	16	22 ml/min

This pump can be converted for multichannel operation by addition of accessories WM-290 and WM-295, up to a limit of 40 channels. For 200/250V 50 Hz single phase supplies. **Requires but does not include flexible tubing of 1·6 mm wall.** ... Each **£120·00** *fxN*

ACCESSORIES

TX-805 **Tubing, silicone rubber,** 1·6 mm wall, bores 0·6 to 8 mm. For use with WM-250 and WM-260. For details and prices see entry in List No. sequence.

WM-290 **Multichannel delta conversion kit,** for use with pump WM-260. Comprising drive adapter, one module WM-295, end plate with priming knob and one set of 10 tube elements 1, 1·5, 2, 2·5 or 3 mm bore. Unless otherwise specified when ordering, 1 mm will be supplied. Flow rates are approximate.

Tube bore	1	1·5	2	2·5	3 mm
Flow, max.	0·30	0·40	0·99	1·40	2·14 ml/min

Each **£43·50** *fxN*

WM-295 **Delta modules, 10 channel,** additional for use with above. These modules can be connected one to another on WM-260 before fitting the end plate. By this means pump WM-260 can be operated up to a limit of 4 modules i.e. 40 channels. Each module is supplied complete with one set of 10 tube elements for 1, 1·5, 2, 2·5 or 3 mm bore tubing as specified when ordering.

Each **£24·00** *fxN*

WM-298 **Tubing, silicone rubber,** for use with WM-290 and WM-295

	1	1·5	2	2·5	3 mm	
Wall	0·35	0·5	0·5	0·5	0·5 mm	
Metre	**£0·15**	**0·20**	**0·25**	**0·30**	**0·40**	*fxN*

DISSOLVED OXYGEN METER

Developed in co-operation with the Freshwater Biological Research Association, for determination of dissolved oxygen in river water, reservoirs, effluents, etc. By means of a Mackereth lead-silver oxygen electrode within a polythene membrane, the instrument gives direct readings in percentage oxygen, relative to the value of a saturated solution of air in the water. The readings are temperature compensated by a resistance thermometer which is also used for measurement of temperature.

The instrument is powered by five *Mallory* batteries and battery check is built in. Recorder outlet sockets are fitted for recording of oxygen concentration and temperature on any 1mA recorders of up to 400 ohms resistance.

	Oxygen	Temperature
Ranges	0–100 and 0–200%†	−5 to 30°C
Accuracy	5% at f.s.d.	±1·5degC
Discrimination	0·5%	0·2degC

Dimensions: 22×19×31 cm Weight: 5·4 kg

† 0 to 100% corresponds to water saturated with air at 760mm Hg.

WP-720

WP-720

DISSOLVED OXYGEN METER, *E.I.L.* **Model 15A,** as specification including probe containing electrode and resistance thermometer. With 5 batteries. Each **£225·50** *fxN*

REPLACEMENT PART

WP-722 **Batteries,** *Mallory* type RM42R. Set of 5 **£16·50** *fxN*

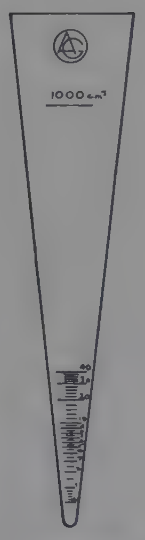
SEDIMENTATION

WP-820

SEDIMENTATION CONE, Imhoff, for determining amount of solid matter in sewage. Capacity 1000 cm³ with lower end graduated to 40 cm³ ... Each **£4·50** *ax*

ACCESSORY

WP-822 **Stand,** wooden, for two cones Each **£3·80** *bx*



WP-820

Other apparatus for **Water and Sewage Testing:**

BT-100 et seq.	Bottles
CT-700 et seq.	Lovibond comparator and nessleriser
CX-200 et seq.	Culture bottles
CX-240 et seq.	Petri dishes
EJ-035 et seq.	Conductivity bridges
EJ-460 et seq.	pH meters
LB-120 et seq.	Labels
ML-050 et seq.	Microscopes
MP-710 et seq.	Graticules

For details see entries in List No. Sequence.

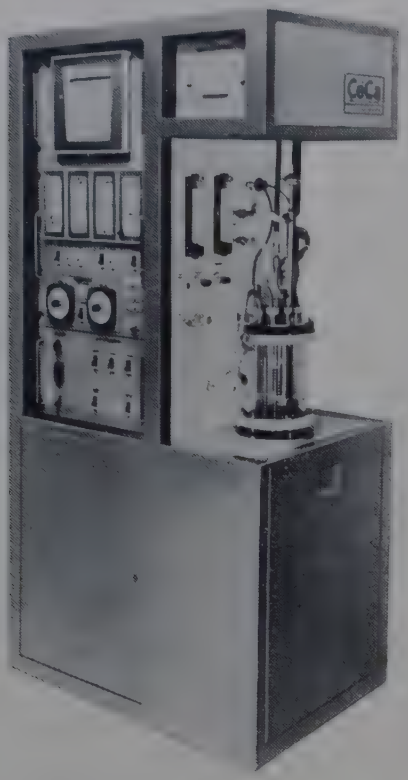
Gallenkamp
REGD. TRADE MARK

MEMBRANE FILTER HOLDERS

Widely used to filter liquids for the separation or examination and analysis of particulate and biological matter.

- **Stainless steel bodies**
- **Models for gravity, vacuum and pressure filtration**
- **Suitable for membrane filter technique for examination of water supplies**

For details and prices see FD-300 et seq. in List No. sequence.



Gallenkamp CeCa

CONTROLLED ENVIRONMENT CULTURE APPARATUS

A compact apparatus suitable for continuous and batch culture of micro organisms and studies of microbiological treatment of effluent and sewage.

- **Accurate auto control and strip chart record of dissolved oxygen, temperature and pH**
- **Accurately controlled adjustable speed high power stirrer**
- **Pumped weir to eliminate accretion of filamentous growths**
- **Integral trolley withdraws for autoclaving complete system *in toto***

For full details and prices see CX-650 et seq. in List No. sequence.

Gallenkamp INCUBATORS

ANHYDRIC

A range of high quality incubators, for use in the fields of biology, microbiology, bacteriology and virology.
For full details and prices see IH-100 and IH-150 in List No. sequence.

COOLED

A range of refrigerated incubators with heaters for working at temperatures below, near to and above ambient temperature. Suitable for:

Membrane Filter technique for water examination

Micro organism culture studies

Biochemical oxygen demand (B.O.D.) testing

For full details and prices see IH-275 to IH-295 in List No. sequence.

SHAKING AND ORBITAL

A range of high quality incubators for growing cultures of micro organisms and tissue cells under controlled conditions of temperature and agitation.

For full details and prices see IH-350 et seq. in List No. sequence.

COLONY COUNTER

Gallenkamp COLONY COUNTER

With transistorised digital counter for counting bacterial and mould colonies.

- **Digital display of colony count**
- **Bright, dazzle free peripheral illumination**

For full details and prices see CX-300 in List No. sequence.

Other *Gallenkamp* apparatus for Water and Sewage Testing

CX-500	Anaerobic culture jar
CX-600	Loop flaming incinerator
FH-500	Flame analyser
OV-010 et seq.	Ovens
WF-360 et seq.	Water baths

For full details and prices see entries in List No. sequence.

Gallenkamp NALFLOC WATER TESTING MINILABS

Regd. Trade Mark

A range of Minilabs for testing feed, boiler and other waters in land installations, developed for use in the *NALFLOC* System of Water Treatment and based on methods published by the British Standards Institution.

Supplied in fitted wooden working cabinets, with necessary apparatus and test methods but **without chemicals.** Sets of reagent chemicals are supplied separately as Chempacs as detailed below.

WR-220

WATER TESTING MINILAB, *NALFLOC*, **Model GA1,** for determination of hardness by Wanklyn soap solution, alkalinity and sulphite. **Requires but does not include one each Chempacs WR-510 and WR-535.** Each **£30·00** *fx*

WR-222

WATER TESTING MINILAB, *NALFLOC*, **Model GA3,** for the determination of total, calcium and magnesium hardness by EDTA, alkalinity and sulphite. **Requires but does not include one each Chempacs WR-510, WR-520 and WR-535** ... ... Each **£30·50** *fx*

WR-230

WATER TESTING MINILAB, *NALFLOC*, **Model GA2,** for determination of hardness by Wanklyn soap solution, alkalinity, sulphite and phosphate. **Requires but does not include one each Chempacs WR-510, WR-530 and WR-535.** ... ... Each **£38·00** *fx*

WR-232

WATER TESTING MINILAB, *NALFLOC*, **Model GA4,** for the determination of total, calcium and magnesium hardness by EDTA, alkalinity, sulphite and phosphate. **Requires but does not include one each Chempacs WR-510, WR-520, WR-530 and WR-535.** Each **£40·00** *fx*

EXTENSION SETS FOR GA1, GA2, GA3 and GA4 MINILABS WR-220 to WR-232

WR-245	**Chloride set** for the determination of chloride. **Requires but does not include Chempac WR-515.**	Each **£2·60** *fx*
WR-247	**Hardness set** for the determination of total, calcium and magnesium hardness by EDTA. **Requires but does not include Chempac WR-520** ...	Each **£4·00** *fx*
WR-250	**Hydrometer set** for the determination of dissolved solids. With hydrometer calibrated at 60°F.	Each **£14·00** *fx*
WR-252	**Hydrometer set** as WR-250 but with hydrometer calibrated at 85°F for use in tropical climates.	Each **£14·00** *fx*
WR-255	**Phosphate set** for the determination of phosphate by the limit method. **Requires but does not include Chempac WR-530**	Each **£9·15** *fx*
WR-257	**Sulphate set** for the determination of sulphate. **Requires but does not include Chempac WR-533**	Each **£6·50** *fx*

WR-260

WATER TESTING MINILAB, *NALFLOC*, **Model O_2Z,** for determination of oxygen in feed water, range 0 to 0·12 ml O_2/litre, by the indigo carmine method, and hydrazine in boiler water by the colorimetric method. **Requires but does not include two Chempacs WR-525** ... ... Each **£71·00** *fx*

WR-265

WATER TESTING MINILAB, *NALFLOC*, **Model P,** for the determination of phosphate by the *Lovibond* comparator method. **Requires but does not include two Chempacs WR-530 and one Chempac WR-531.** Each **£50·00** *fx*

REPLACEMENT COMPONENTS FOR MINILABS see overleaf.

CHEMPACS FOR MINILABS

Chempacs comprise sets of reagents for various tests as listed below and are packed in cases suitable for home and export delivery. Prices include cost of bottles and cases which are non-returnable.

WR-510	**Chempac basic reagent**	Each	**£6·40**	*fx*
WR-515	**Chempac chloride reagent** ...	Each	**£4·00**	*fx*
WR-520	**Chempac EDTA reagent** ...	Each	**£8·50**	*fx*
WR-525	**Chempac oxygen hydrazine reagent.**	Each	**£5·50**	*fx*
WR-530	**Chempac phosphate reagent** ...	Each	**£5·10**	*fx*
WR-531	**Chempac reagent (acid packs)** ...	Each	**£4·10**	*fx*
WR-533	**Chempac sulphate reagent** ...	Each	**£4·80**	*fx*
WR-535	**Chempac sulphite reagent** ...	Each	**£4·00**	*fx*

COMPONENTS OF Gallenkamp NALFLOC MINILABS

Regd. Trade Mark

List No.		Each	
WR-600	**Bottle, dispensing,** polythene, 125 ml, labelled	£	
	METHYL ORANGE	0·15	*cx*
	PHENOLPHTHALEIN	0·15	*cx*
	POTASSIUM CHROMATE	0·15	*cx*
	WETTING AGENT	0·15	*cx*
WR-610	**Bottle, dropping,** polythene, 125 ml (rectangular shape)	0·55	*cx*
WR-615	**Bottle, dropping,** polythene, 125 ml, labelled		
	ACID MOLYBDATE	0·65	*cx*
	AMMONIA BUFFER	0·65	*cx*
	CARBONATE/SULPHITE	0·65	*cx*
	HYDROCHLORIC ACID, 0·5N	0·65	*cx*
	HYDROQUINONE	0·65	*cx*
	POTASSIUM HYDROXIDE 26·87% w/w K_2O	0·65	*cx*
	SULPHATE BUFFER SOLUTION	0·65	*cx*
	SULPHURIC ACID, 6·5%	0·65	*cx*
WR-670	**Bottle, reagent,** glass, 30 ml, with pipette	0·45	*cx*
WR-690	**Bottle, wide mouth,** polythene, 60 ml, labelled		
	BARIUM CHLORIDE—POISON	0·15	*cx*
	CALCIUM HARDNESS INDICATOR	0·15	*cx*
	HYDROQUINONE TABLETS	0·15	*cx*
	IODINE INDICATOR	0·15	*cx*
	SODIUM DIETHYLDITHIOCARBAMATE	0·15	*cx*
	SODIUM PERSULPHATE	0·15	*cx*
	TOTAL HARDNESS INDICATOR	0·15	*cx*
WR-710	**Cotton buds,** pkt.	0·15	*cx*
WR-750	**Burette, automatic,** with labelled polythene reservoir		
	BARIUM CHLORIDE, 0·04N	2·20	*cx*
	EDTA SOLUTION, 0·02N	2·20	*cx*
	POTASSIUM IODATE/IODIDE	2·20	*cx*
	SILVER NITRATE, 0·02N	2·40	*cx*
	SOAP SOLUTION, WANKLYN'S	2·20	*cx*
	SULPHURIC ACID, 0·02N	2·20	*cx*
WR-751	**Burette** only, amber, for WR-750 silver nitrate	1·40	*ax*
WR-790	**Comparator block,** *Lovibond*, for phosphate limit test. Replacement for WR-230, WR-232 and WR-255	3·30	*fx*
WR-840	**Filter unit, complete**	1·90	*cx*
WR-880	**Hydrometer,** 60°F	8·90	*cx*
WR-885	**Hydrometer,** tropical, 85°F	8·90	*cx*

List No.		Ten	Each	
		£	£	
WR-948	**Pipette,** bulb, 10 cm³	3·70	0·43	*ax*
WR-951	**Pipette,** graduated, 5 cm³	6·20	0·70	*ax*
WR-952	**Pipette,** graduated, 10 cm³, fast	5·50	0·62	*ax*
WR-980	**Stirring rod,** polythene, 150 × 8 mm	2·50	0·31	*cx*
WR-981	**Stirring rod,** glass, 150 × 6 mm	1·50	0·22	*ax*
WR-982	**Stirring rod,** glass, 300 × 8 mm, with button end	1·50	0·22	*ax*
WR-990	**Test tube,** polypropylene, 15 ml	2·10	0·28	*mx*

List No.		
BH-345	**Basin,** polypropylene, 200 ml capacity	For details and prices see entries in List No. sequence
BJ-655	**Beaker,** 100 ml	
BT-140	**Bottle, reagent,** glass, 250 ml	
BW-544	**Burette,** 10 cm³, for WR-750 except silver nitrate	
BW-055	**Burette pinchcocks,** for WR-750 and BW-544	
CM-742	**Cleaner,** liquid detergent	
CT-835	**Nessleriser,** *Lovibond*	
CT-858	**Nessler disk,** NOE, O_2 in H_2O	
CT-859	**Nessler disk,** NOH, hydrazine in H_2O	
CT-846	**Nessler cylinder,** modified	
CT-826	**Comparator disk,** 3/12	
CT-700	**Comparator,** *Lovibond* — Replacements for WR-265 (CT-826, CT-700, CT-716)	
CT-716	**Cells,** 13·5 mm	
CY-244	**Cylinder,** glass, graduated 10 cm³ with plastics stopper	
	,, ,, ,, 50 cm³ ,, ,,	
	,, ,, ,, 100 cm³ ,, ,,	
CY-298	**Cylinder, TPX,** graduated 10 cm³	
	,, ,, ,, 50 cm³	
FC-200	**Filterpaper,** *Whatman* No. 1, 15 cm	
FC-230	**Filterpaper,** *Whatman*, No 6, 15 cm	
FC-540	**Ashless floc,** *Whatman*	
FP-322	**Funnel,** polypropylene, 9 cm	
HT-520	**Hydrometer jar,** polythene	
PM-104	**Pipette,** bulb, 5 cm³	
PM-344	**Pipette,** graduated 1 cm³	
	,, ,, 2 cm³	
	,, ,, 10 cm³	
RV-220	**Rubber teat,** capacity 2·5 ml	
TJ-102	**Thermometer** GP105C/0·5/100	
TJ-106	,, GP220F/100	
WB-100	**Washbottle,** 250 ml	
	Washbottle, 600 ml	

WT-015

WEIGHING BOATS, polystyrene, disposable. A light, paper-thin boat which can be shaped with the fingers to form a pouring funnel. Capacity approximately 20 ml. In pack containing 500 boats. ... ... Pack **£3·50** *mx*

WT-018

WEIGHING BOTTLE, Pregl pattern, to BS 1428 Pt. H1, with ground-in stopper. Dimensions, approximately 8 mm high, 7 mm diameter.
Ten **£5·40** Each **£0·60** *ax*

WT-020

WEIGHING BOTTLES, glass, Ⓐ, with ground-in hollow blown stopper.

Height	40	50	60	80	100 mm	
Diameter	20	25	30	40	50 mm	
Ten	**£2·05**	**2·55**	**2·85**	**4·20**	**7·40**	*ax*
Each	**£0·27**	**0·32**	**0·35**	**0·47**	**0·82**	

WT-040

WEIGHING BOTTLES, glass, Ⓐ, squat shape, with ground-in hollow blown stopper.

Height	30	30	30 mm	
Diameter	40	50	60 mm	
Ten	**£5·50**	**6·60**	**8·80**	*ax*
Each	**£0·62**	**0·74**	**0·98**	

WT-050

WEIGHING BOTTLES, glass, Ⓐ, with flat cap, ground on outside of bottle below the rim.

Height	50	60	70 mm	
Diameter	25	30	40 mm	
Ten	**£2·40**	**3·60**	**4·60**	*ax*
Each	**£0·31**	**0·42**	**0·51**	

WT-065

WEIGHING BOTTLES, polycarbonate, with close fitting lid. Can be used in drying ovens up to 110°C.

Height	25	50 mm	
Diameter	40	40 mm	
Ten	**£1·60**	**1·80**	*fx*
Each	**£0·23**	**0·26**	

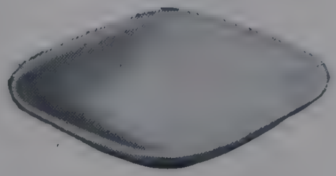
WT-070

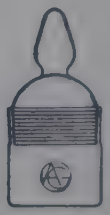
WEIGHING BOTTLE, polythene, translucent, with close fitting lid. 50 mm height × 25 mm dia.
Ten **£0·66** Each **£0·14** *mx*

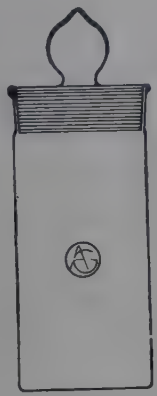
WT-150

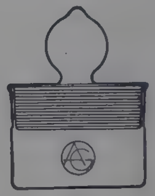
WEIGHING SCOOPS, glass, Ⓐ.

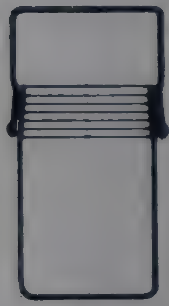
Length	65	80 mm	
Ten	**£5·00**	**5·70**	*ax*
Each	**£0·56**	**0·64**	

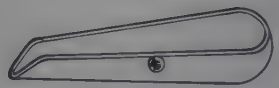

WT-015


WT-018

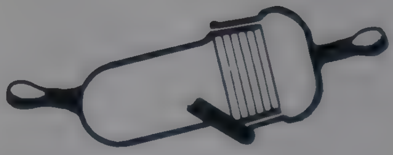

WT-020


WT-040


WT-050


WT-150

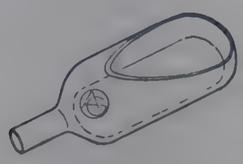
WT-065
(WT-070 is similar)


WT-165

WT-165

WEIGHING PIG, Pregl pattern, with ground-on cap, handles and two feet. Length overall 55 mm, diameter 10 mm ... ... Ten **£21·00** Each **£2·35** *ax*

GLASS TUBES suitable for use as weighing bottles
—see TW-630 in List No. sequence.

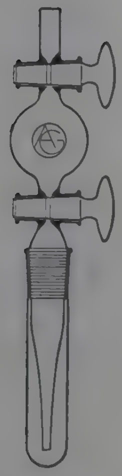


WT-170

WT-170

WEIGHING FUNNELS, glass, (AG), for preparation of standard solutions for volumetric analysis. The solid material is weighed in the funnel and then transferred to a volumetric flask by inserting the spout end into the neck of the flask and washing down with solvent from a washbottle. Combines the functions of weighing boat and funnel with improved convenience and accuracy.

Overall length, approx.	65	95 mm	
Body length, approx.	45	65 mm	
Body diameter, approx.	20	30 mm	
Ten	**£3·40**	**4·30**	*ax*
Each	**£0·40**	**0·48**	



WT-190

WT-190

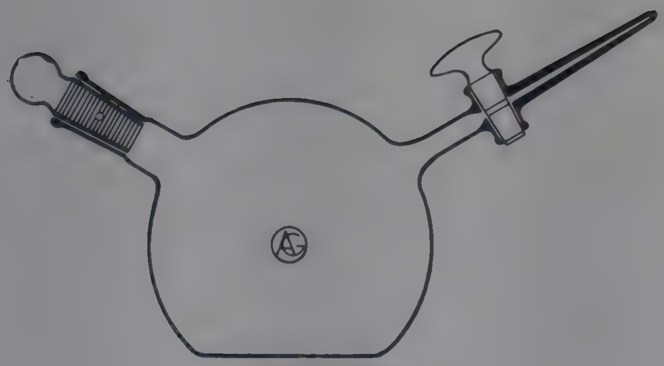
WEIGHING PIPETTE, Lunge-Rey, (AG), to BS 2058, for weighing corrosive acids, with reservoir and two straight bore stopcocks, capacity approx. 5 ml.

Ten **£25·50** Each **£2·85** *ax*

WT-200

WEIGHT BURETTE, borosilicate glass, (AG), capacity approx. 120 ml, for gravimetric titrations. as designed by H. N. Redman, Imperial Chemical Industries Limited, Billingham Division and described in Analyst 1963 Vol. 88 p. 654. Comprises a flat-bottomed container with a filling neck and stopper drilled for admission of air, and a discharge jet and stopcock. The burette weighs approx. 70 g. When being weighed before and after titration the weight burette sits firmly on the balance pan on its flat bottom and loss of contents by evaporation is eliminated by the stopper and stopcock. During titration the burette can be supported by a retort ring with the jet pointing vertically downwards as with a volumetric burette.

Ten **£38·00** Each **£4·20** *ax*



WT-200

WT-220

LEAD SHOT, for weighing and counterpoising, mixed sizes of nominal diameters 0·5 to 2·5 mm. In pack containing approximately 0·5 kg.

10 packs **£7·80** Pack **£0·86** *cx*

ADDENDA

AND CORRIGENDA

The following pages include items too late for insertion in alphabetical position in the catalogue, together with corrections which have become necessary during the course of printing.

ADDENDA

Mettler
PRECISION SPRING BALANCES

The *Mettler* E range of precision, top loading spring balances, comprising BA-854 which appears on page 42 and the following two balances, incorporate springs which eliminate the need for counterweights.

***BA-790**
BALANCE, precision, spring, *Mettler* E200.
Weighing range **200 g.** Readability **0·01 g.**
Capacity 300 g. Precision ±0·02 g.
Optical scale range 200 g, total weight within weighing range displayed digitally. Tare 100 g. In two-tone metal housing ... ... Each **£199·00** *kx*

***BA-796**
BALANCE, precision, spring, *Mettler* E2000.
Weighing range **2000 g.** Readability **0·1 g.**
Capacity 2600 g. Precision ±0·2 g.
Optical scale range 2000 g, total weight within weighing range displayed digitally. Tare 600 g. In two-tone metal housing ... ... Each **£219·00** *kx*

Mettler E200
BA-790
(BA-796 is similar)

Mettler WINDSHIELD

***BA-961**
WINDSHIELD, *Mettler* LP 103, transparent, for use with P160, P161, P162, P163, P203, P323, P1000, P1200, P1210, P2000, P2010 and P2210 top loading precision balances. Internal dimensions 170×170×170 mm.
Each **£14·00** *kx*

BA-961 with BA-818

BC-570 (page 54).
BALANCE. Amendment.
For 'brass' read 'aluminium'.

Amal 'GRADUATE' BURNERS

BX-052
BURNER, Meker, *Amal* **'Graduate',** for **coal gas.** With No. 230 jet. Burner head diameter 25 mm.
Ten **£13·40** Each **£1·50** *cx*

BX-225
BURNER, Bunsen, *Amal* **'Graduate',** for **methane.** With No. 90 jet, 13 mm burner tube and air regulator.
Ten **£10·40** Each **£1·16** *cx*

BX-252
BURNER, Meker, *Amal* **'Graduate',** for **methane.** With No. 55 jet. Burner head diameter 25 mm.
Ten **£13·40** Each **£1·50** *cx*

BX-442
BURNER, Meker, *Amal* **'Graduate',** for **butane and propane** at approx. 28 cm W.G. With No. 30 jet. Burner head diameter 25 mm.
Ten **£13·40** Each **£1·50** *cx*

BX-052
(BX-252 and BX-442 are similar)

BX-225

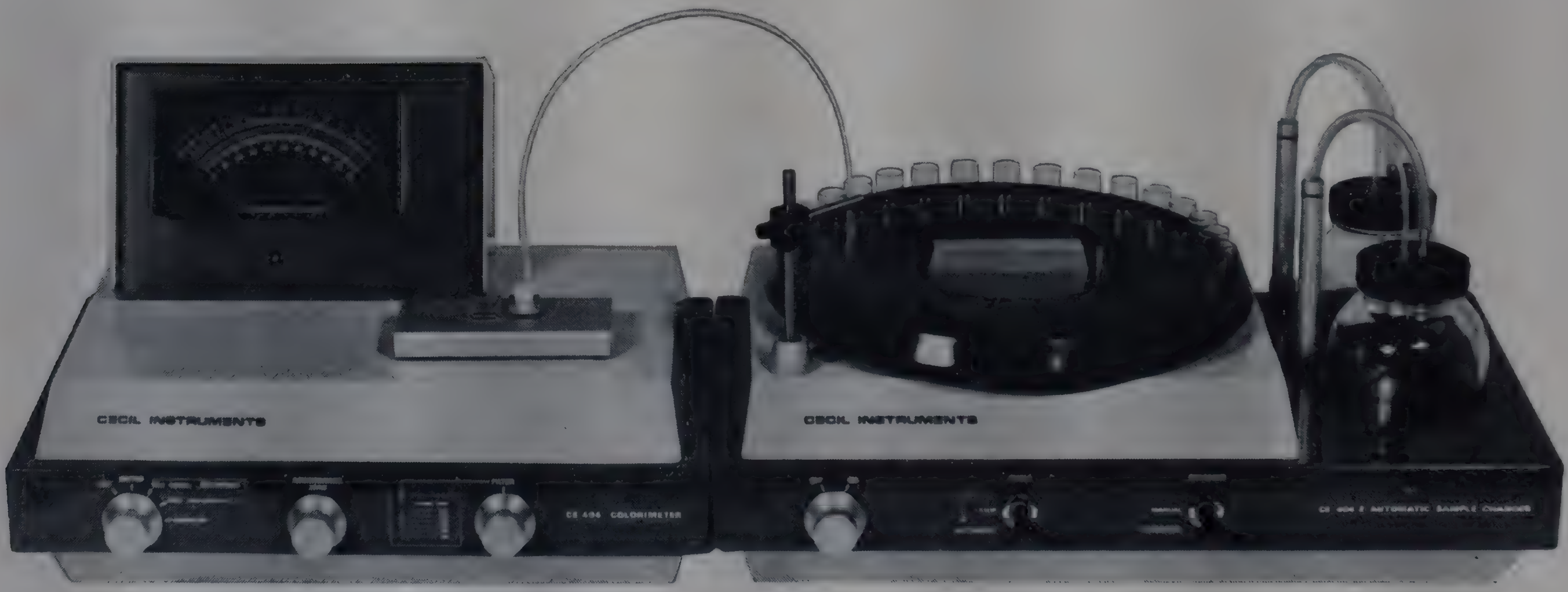
CECIL SERIES CE 404 COLORIMETER SYSTEMS

A versatile modular series which provides effective instrumentation for both single and multiple determinations.

The CE 404 System reduces operator fatigue to a minimum. Quality, reliability, convenience and ease of maintenance have been major considerations in the design.

Applications:

- **Clinical chemistry**
- **Biochemistry**
- **Organic and inorganic analytical chemistry**
- **Industrial and quality control chemistry**
- **Agricultural chemistry**
- **Food analysis**
- **Metallurgy**
- **Monitoring automatic analyses**



CS-680 Colorimeter with CS-688 and accessories

Typical clinical chemistry analyses for which series CE 404 systems are suitable:

— Glucose, urea and haemoglobin in blood.
— Bilirubin, total protein and acid phosphatase in plasma.
— Inorganic phosphates in plasma and whole blood.
— Salicylates, creatinine, urea and ammonia in urine.
— Sugar in cerebro-spinal fluid.
— Acid or alkaline phosphates in serum.

CECIL SERIES CE 404 COLORIMETER SYSTEMS
PRINCIPAL MODULES

COLORIMETER (*Cecil* CE 404)
A compact instrument with clearly visible sloping meter graduated in absorbance and transmittance. Controls comprise monitor and recording selector switch, colour filter selector and absorbance zero knob.

Main features of the colorimeter are: A high performance solid state electronic stabiliser which ensures stability of the lamp output against large mains voltage and frequency changes, at the same time ensuring long term stability against temperature drift.

Long term stability is such that many samples can be measured without resetting the absorbance zero.

Wavelength is determined by one of six filters selected by a control knob. Filters are labelled on the control panel for easy identification.

The replaceable filter disc enables alternative filter selections to be used.

A highly collimated aspherical optical system enables reference solutions of about 0·8 optical density units to be used with all standard filters.

The absorbance zero control provides both coarse and fine adjustment by means of a simple control.

A graded beam attenuator is used to produce an almost constant absorbance zero control sensitivity over the full range of operation.

An outlet is provided for a 10 mV recorder.

The five position main switch provides the following settings: off—meter—recorder—high sensitivity recorder—monitor:

> With the mains switch in the 'OFF' position, the meter is highly damped to protect it from possible damage in transit.
>
> The **'High Sensitivity Recorder'** setting enables filters of 20 mμ bandwidth (e.g. Ilford Spectrum Series) to be used when measurements are made with a recorder, thus increasing the range of problems to which the instrument may be applied. Alternatively samples up to about 1·4 optical density units may be used in the high sensitivity recorder mode with the standard filters.
>
> The **'Monitor'** setting enables the performance of the instrument to be checked using the instrument's own meter. This is valuable when checking that adjustments have been made correctly and that the lamp and detector are up to specification.

A two position cell slide accommodates rectangular cells of 5 mm and 10 mm pathlength, test tubes, flowcell, and automatic flowcell. No cell cover is required in normal operation making rapid cell changing possible. A spillage outlet is provided below the cells.

Accessories such as the cell pump or automatic sample changer are connected to the power outlet provided on the colorimeter.

The interior of the instrument is accessible by removing a retaining screw which enables the top cover complete with meter to be hinged open.

CELL PUMP UNIT (*Cecil* CE 404-1)
This unit is modular with the colorimeter and contains a small vacuum pump which, when activated by depressing a switch, draws the used sample into a waste reservoir. The use of the cell pump unit makes it unnecessary to operate the instrument near a sink and water tap.

A patented system for connecting the ptfe tube to the cell and reservoir makes assembly and maintenance easy.

SAMPLE CHANGER (*Cecil* CE 404-2)
A self contained module with programmer, sample probe mechanism, pumps, reservoirs and sample transport mechanism.

Up to 30 samples on a turntable are automatically presented to the colorimeter in sequence at the rate of 3 samples per minute.

An escapement mechanism on the sample turntable drive makes it impossible for a sample to be accidentally missed and cause data readout to be incorrectly synchronised with samples.

The sample changer automatically stops at the end of 30 samples.

CECIL INSTRUMENTS

CS-680 Colorimeter

CS-684 Cell pump unit

CECIL SERIES CE 404 COLORIMETER SYSTEMS

AUTOMATIC COLORIMETRY

- **Three samples per minute**
- **Prewash cycle virtually eliminates cross contamination**
- **2·5 ml minimum samples**
- **Up to 30 samples on preloaded turntables**
- **Absorbance values recorded on preprinted charts**
- **High sensitivity facility for measurements at 20 mμ bandwidth**
- **Manual override**
- **Automatic stop**

Automatic colorimetry with a CE 404 system is available at a cost which most laboratories can afford. If the workload does not immediately require the sophistication of an automatic system, then the CE404 manual colorimeter may be used to begin with.

As the workload grows an automatic sample changer and data recording system may be added without any modification to the colorimeter. All that is required is to plug the sample changer into the colorimeter and the recorder into the sample changer.

A prewash cycle in which the cell and sample tubes are washed with a small quantity of the actual sample to be measured virtually eliminates cross contamination.

3 ml of sample are required for a measurement. The samples are contained in disposable glass vials and the measurement is made in a 10 mm pathlength rectangular flowcell.

Turntables may be preloaded away from the instrument and rapidly mounted on the sample changer when required.

Absorbance data recording on a 10 mV recorder gives a series of peaks on preprinted charts with samples numbered for rapid and easy identification. Each chart corresponds with one turntable load.

Manual override of the automatic system is provided for calibration or to measure special samples manually in the flowcell.

The sample reservoir has a capacity for 200 samples. All connecting tubes are easily assembled and replaced.

STREAM ANALYSIS

The excellent stability and sensitivity of the CE 404 make it ideal for continuous monitoring of streams, or as the detector in automatic chemistry systems using System 7, or System 8 which includes a recorder.

With these systems an adjustable cell holder is fitted in place of the normal cell slide. A micro flowcell with pathlength 10 mm and a working volume of 75 μl is provided as standard.

MANUAL COLORIMETRY

Rectangular cells

Sample and reference cells each of 10 mm or 5 mm pathlength are located in the beam by a two position cell slide.

Minimum sample requirement less than 1 ml in 5 mm cell.

Cell faces are not scratched by insertion into the instrument.

Cell covers normally not required, allowing rapid cell changing.

Cell slides are made of anodised aluminium.

Test tubes

Simple ptfe adaptor locates 13 mm test tubes without damaging the optical surface.

Selected matched glass test tubes are available.

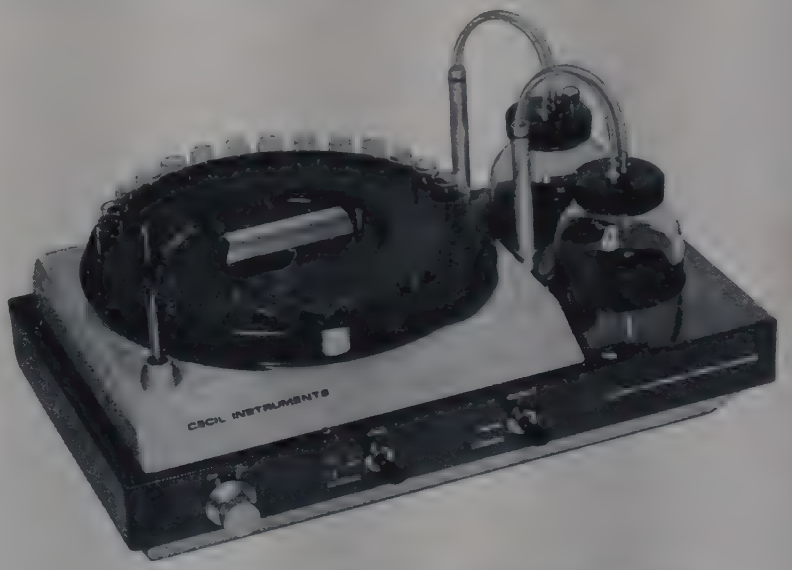
Minimum sample volume required is 1·5 ml.

Effective pathlength of test tubes is about 10 mm.

Flow cells

To increase the speed and convenience of operation, samples may be measured using the flowcell and cell pump to reduce the time required for emptying, cleaning and refilling cells.

The 10 mm pathlength flowcell ensures low sample carry over. The cell is filled by pouring the sample into a metering funnel which allows the correct volume to be measured into the cell.



CS-688 Sample changer with accessories

TECHNICAL DATA

Light source:	4V 1A high efficiency krypton filled tungsten lamp.
Electronics:	all solid state lamp stabiliser.
Wavelength:	six filters, Ilford Nos. 621, 622, 624, 625, 626, 608, selected by a control knob.
Bandwidth:	typically 40 mμ defined by filters, source, and detector responses; approximately 20 mμ when operating in the 'High Sensitivity Recorder' mode using Ilford 'Spectrum' series filters on accessory filter disc.
Optical system:	wide aperture double plano-aspherical lens system provides high collimation.
Reserve sensitivity:	permits samples of up to about 0·8 optical density units to be used with all filters.
Stability:	absorbance zero changes by less than ±0·0008 absorbance units for a 10% mains voltage change about the nominal. Drift of the absorbance zero is less than ±0·002 optical density units in any ten minute period after initial warm up, and normally less than ±0·001 optical density units on blue, green or yellow filters.
Absorbance zero:	set by single control giving both coarse and fine setting of a graded beam attenuator.
Reproducibility:	better than ±0·2% of full scale deflection.
Meter readout:	scaled in both absorbance and transmission with antiparallax mirror. Absorbance scale length 11·5 cm.

Recorder output:	10 mV at 1K impedance, or 10 mV at 5K impedance on high sensitivity setting.
Cuvette holder:	two position kinematic cell slide.
Cuvettes:	10 mm and 5 mm pathlength rectangular cells, 13 mm test tubes and 10 mm flowcell.
Minimum sample volume:	less than 1 ml in 5 mm pathlength cell: and less than 2 ml in 10 mm pathlength cell.
Sample temperature:	rises by 2degC in 30 minutes from switch on.
Flowcell:	10 mm pathlength; minimum sample volume 2·5 ml.
Cell pump unit:	contains vacuum pump and 650 ml reservoir. Cell connected to reservoir by ptfe tubing
Automatic cycle time:	20 seconds per sample.
Sample vials:	5 ml capacity, glass.
Sample capacity:	30 samples per turntable.
Sample volume:	automatic operation less than 3 ml.
Sample carryover:	negligible with wash cycle; i.e. with aqueous solutions less than 0·25%.

Dimensions and weights:

Colorimeter:	37×24×26 cms	9 kg.
Cell pump:	12×24×26 cms	2¼ kg.
Automatic sample changer:	43×24×26 cms.	10 kg.

CECIL SERIES CE 404 COLORIMETER SYSTEMS

CS-610

COLORIMETER, *Cecil,* **CE 404, System 1, manual.** Comprising colorimeter, two 10 mm pathlength cells, test tube adapter, pack of 10 selected test tubes, spare fuse and lamp, dust cover. For 200/250V 50 Hz single phase supplies ... ... Each **£146·00** *fx*

CS-615

COLORIMETER, *Cecil,* **CE 404, System 2, flowcell.** Comprising colorimeter, cell pump, 10 mm pathlength flowcell with funnel, spare reservoir, spare fuse and lamp, dust cover. For 200/250V 50 Hz single phase supplies. Each **£185·00** *fx*

CS-620

COLORIMETER, *Cecil,* **CE 404, System 3, manual and flowcell.** Comprising colorimeter, cell pump, two 10 mm pathlength cells with lids, test tube adapter, one pack of 10 selected test tubes, 10 mm pathlength flowcell with funnel, spare reservoir, spare fuse and lamp, dust cover. For 200/250V 50 Hz single phase supplies. Each **£194·00** *fxN*

CS-625

COLORIMETER, *Cecil,* **CE 404, System 4, automatic and manual.** Comprising colorimeter, automatic sample changer, 10 mm pathlength automatic flowcell, 500 glass sample vials, two 10 mm pathlength cells with lids, spare reservoir, spare fuse and lamp, dust cover. For 200/250V 50 Hz single phase supplies ... Each **£468·00** *fxN*

CS-630

COLORIMETER, *Cecil,* **CE 404, System 5, automatic** (with non-linear absorbance data recorder) **and manual.** Comprises **outfit as CS-625** with non-linear absorbance recorder, pack of 100 preprinted charts and spare sample turntable, recorder signal lead and signal lead adapter. For 200/250V 50 Hz single phase supplies. Each **£812·00** *fxN*

CS-635

COLORIMETER, *Cecil,* **CE 404, System 6, automatic** (with linear absorbance data recorder) **and manual.** Comprises **outfit as CS-625** with linear absorbance recorder, pack of 100 preprinted charts and spare sample turntable, recorder signal lead and signal lead adapter. For 200/250V 50 Hz single phase supplies. Each **£906·00** *fxN*

CS-640

COLORIMETER, *Cecil,* **CE 404, System 7, stream analysis.** Comprises CE 404 Colorimeter with six Ilford filters, stream analysis flowcell, adjustable flowcell holder, cell compartment cover, spare source, spare fuse and instruction manual. **Without recorder.** For 200/250V 50 Hz single phase supplies ... ... Each **£169·00** *fxN*

CS-645

COLORIMETER, *Cecil,* **CE 404, System 8, stream analysis.** Comprises **outfit as CS-640** together with linear transmittance pen recorder, two chart rolls ruled linear in transmittance, interconnection lead and a recorder lead adapter. For 200/250V 50 Hz single phase supplies. Each **£500·00** *fxN*

When ordering please state voltage and frequency of supply.

Models for 110V 60 Hz single phase supplies—prices on application.

COMPONENTS, REPLACEMENT PARTS AND ACCESSORIES

CS-680	**Colorimeter,** complete with krypton filled tungsten lamp, lamp stabiliser, filter disc with six filters, photocell, two position cell slide, mains cable and instructions manual ... ... Each **£136·00** *fxN*
CS-684	**Cell pump unit,** complete with vacuum pump reservoir, PVC vacuum line, ptfe sample tube, mains cable and plug for connection to colorimeter ... ... Each **£34·50** *fxN*
CS-688	**Automatic sample changer,** complete with two reservoirs, one sample turntable, sample probe, PVC vacuum line, ptfe sample tube, mains cable and plug for connection to colorimeter, output plug and lead. Each **£306·00** *fxN*
CS-691	**Sample vials for CS-688.** In pack of 500. Pack **£6·40** *fxN*
EF-680	**Recorder, linear transmittance,** (non-linear absorbance). Requires but does not include adapter SL-719 and charts CS-698. For details and prices see entries in List No. sequence.
SL-719	**Adapter,** for recorder. For price see entry in List No. sequence.
CS-698	**Charts, ruled non-linear absorbance.** In pack of 100. Pack **£2·50** *fx*
CS-702	**Recorder, linear absorbance.** Requires but does not include adapter SL-719 and charts CS-704. Each **£426·70** *fxN*
SL-719	**Adapter,** for recorder. For price see entry in List No. sequence.
CS-704	**Charts, ruled linear absorbance,** for use with CS-702. In pack of 100 ... ... Pack **£2·50** *fx*
CS-710	**Rectangular cell,** 10 mm pathlength ... Each **£2·80** *fx*
CS-712	**Lid,** for CS-710 ... ... Each **£0·35** *fx*
CS-714	**Rectangular cell,** 5 mm pathlength ... Each **£3·20** *fx*
CS-718	**Flowcell,** 10 mm pathlength with 3 funnels Each **£13·00** *fxN*
CS-722	**Automatic flowcell,** 10 mm pathlength complete with ptfe stopper for vacuum and sample line connections. Each **£13·00** *fxN*
CS-728	**Test tubes,** selected, 100 × 13 mm o.d. In pack of 10. Pack **£4·30** *fx*
CS-732	**Adapter,** for use with CS-728 ... ... Each **£1·20** *fxN*
CS-736	**Filter set,** Ilford Spectrum Series Nos 601, 602, 604, 605, 606 and 608 mounted on disc. Accessory set for use with high sensitivity recorder ... ... Set **£21·30** *fxN*
CS-746	**Sample turntable,** spare ... ... Each **£12·30** *fxN*
CS-748	**Lamp,** 4V, 1A, spare ... ... Each **£2·60** *fx*

When ordering please state voltage and frequency of supply.

CW-750 (page 151). Amendments

RUBBER CONES. Delete 'In packs of 10'.

Pricing. For '10 packs' read Ten.
For 'Pack' read Each.

FILTER FUNNELS (page 232). Amendment
Delete 'FD-582 can be used . . . its own weight'.

REPLACEMENT PARTS (page 259).
Revised specification and price.

FR-522 **Wound muffle,** complete with insulating wrap. Each **£14·00** *bx*

REPLACEMENT PARTS (page 261).
Revised specifications and prices.

FR-620 **Wound muffles,** complete with insulating wrap.

Size No.	1	2	3	
Each	**£19·00**	**38·50**	**45·00**	*bx*

BENCH UNITS (page 280). Price amendments.

FX-182	Each	**£53·00**	**FX-193**	Each	**£50·00**
FX-183	Each	**£69·00**	**FX-201**	Each	**£88·00**
FX-191	Each	**£40·00**	**FX-202**	Each	**£88·00**
FX-192	Each	**£40·00**	**FX-203**	Each	**£93·00**

FX-840 (page 305).
ASBESTOS CEMENT, 8 kg pack. Cancelled.

GD-525

PRESSURE REGULATOR, laboratory pattern, two stage, for oxygen, air, nitrogen and argon, threaded $\frac{5}{8}$ in BSP right hand to BS 341 Part I Outlet 3. The contents gauge is dual scaled 0 to 280 kgf/cm^2, 0 to 4000 lbf/in^2 and the outlet pressure gauge is dual scaled 0 to 0·7 kgf/cm^2, 0 to 10 lbf/in^2. With fine pressure control knob, low pressure safety vent set to operate at 1·1 kgf/cm^2, sintered metal gas filter, outlet nozzle for 6·5 mm bore flexible tubing and inlet connection to cylinder **which can be hand tightened without the use of a spanner** ... ... Each **£29·50** *mx*

GD-525

MV-815 (page 467).
MOLECULAR MODELS. Amendment to last line. Delete 'with instructions booklet'. For 'SP-960' read SP-950'.

Frame at bottom left hand column. For 'SP-960' read 'SP-950.'

Olympus

STEREOSCOPIC MICROSCOPE/ MAGNIFIER

A simple magnifier suitable for many inspection and dissection applications in schools.

- **High quality optics**
- **Wide field stereoscopic image**
- **Fixed ×10 magnification**
- **Adjustable interpupillary distance**
- **No controls to be manipulated**

***ML-308**

MICROSCOPE/MAGNIFIER, *Olympus*, **stereoscopic,** with binocular head mounted on a flexible arm fitted to a circular base. Magnification is fixed at ×10 and there are no focussing controls. The required viewing is achieved by adjusting the flexible arm and by positioning the sample under the binocular head. Field of view 22 mm; working distance 90 mm ... ... Each **£27·50** *px*

ML-308

Olympus
MODEL KHS MICROSCOPE

*ML-141

MICROSCOPE, *Olympus* **Model KHS,** as ML-140 but with 25W lamp and controller in the base to provide variable intensity illumination ... ... Each **£174·00** *px*

REPLACEMENT PART

***ML-147 Lamp bulb,** 25W, for ML-141 illuminator. Each **£1·00** *px*

Olympus
MODEL EHS MICROSCOPES

High performance microscopes with sensitive stage focusing.

- **Choice of binocular or trinocular head**
- **Built-in mechanical stage**
- **Preset focus lock protects slides and objectives**
- **Wide range of optical elements**

STANDS

Rigid stands with built-in illuminators and provision for interchangeable heads and stages. Focusing range: coarse 32·5 mm; fine 1·2 mm. An adjustable focus stop protects objectives and specimens and facilitates the use of oil immersion objectives.

HEADS

Inclined binocular and trinocular heads are supplied as standard. Monocular, wide field and double observation heads available.

EYEPIECES

Huygenian, wide field, high eyepoint, compensating, photographic graticule and pointer eyepieces available.

NOSEPIECE

The quintuple click-stop nosepiece is mounted on ball bearings for smooth and accurate operation.

OBJECTIVES

Achromatic and planachromatic lenses as standard. Fluorite, apochromatic and plan-apochromatic and phase contrast objectives available.

ML-162

STAGE

Horizontal square mechanical stage with low level coaxial controls providing 52×76 mm movement with vernier reading to 0·1 mm.

CONDENSER

Models are fitted with Abbé condenser N.A. 1·25 with iris diaphragm and swing-out filter.

ILLUMINATION

A Köhler system using a 15W tungsten lamp fed from a built-in transformer and voltage controller, with voltmeter.

For Lens Code see page 484.

RECOMMENDED ASSEMBLIES

List No.	Model	Ocular eyepieces (paired)	Objectives	Condenser	Head	Each	
***ML-160**	EHS-221	BiWF×10	N×4 N×10 N×40 S×100	Abbé N.A. 1·25	Binocular	£ 273·00	*px*
***ML-162**	EHS-231				Trinocular	294·00	*px*
***ML-164**	EHS-233	BiHEPWF×10	Pl×4 Pl×10 Pl×40 Pl×100	Abbé N.A. 1·25	Trinocular	434·00	*px*

REPLACEMENT PART

***ML-168 Lamp bulb,** 15W ... ... Each **£1·20** *px*

ACCESSORIES

HJ-520 Immersion oil. For price see entry in List No. sequence.

Eyepieces, Objectives, Condensers ...	See pages 446 to 451
Phase contrast accessories	
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